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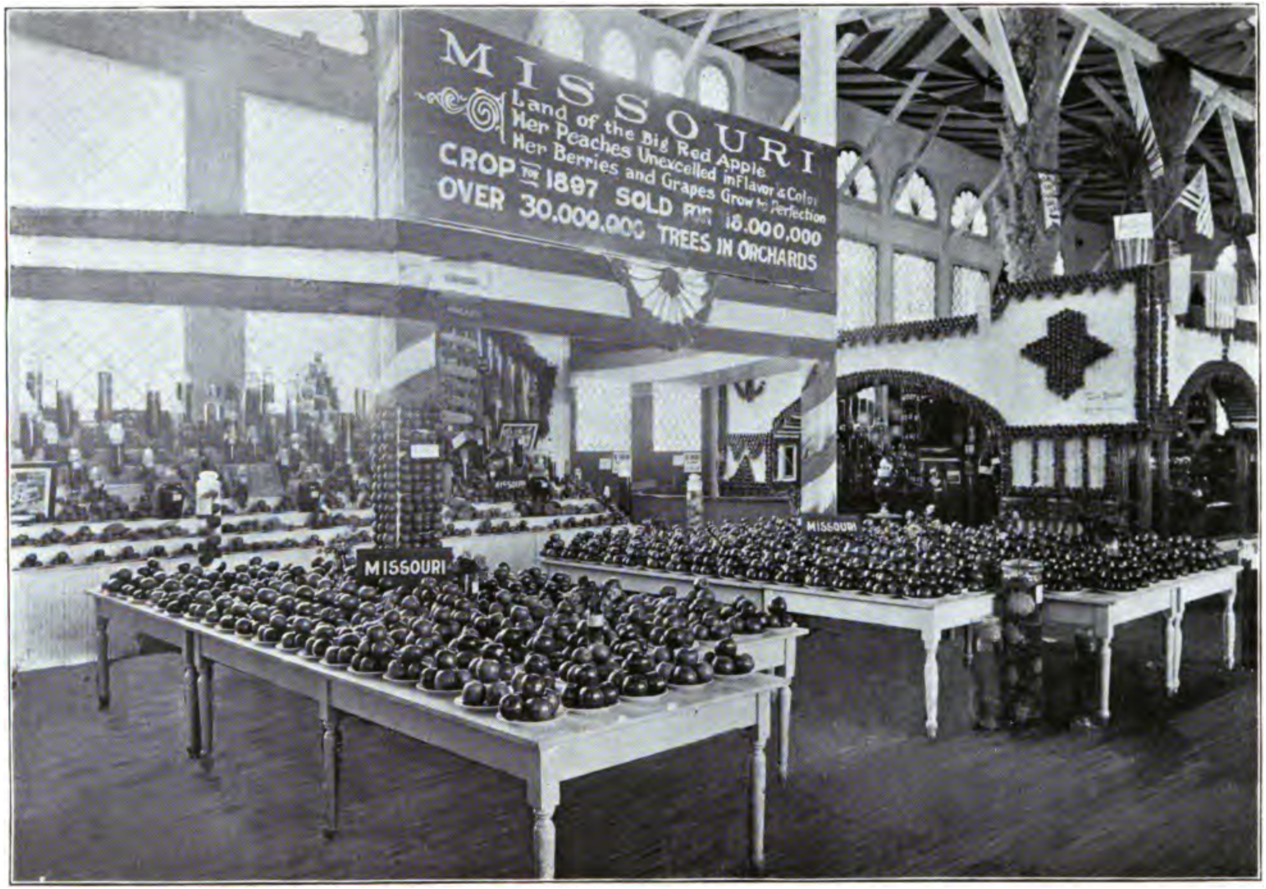
MISSOURI
Land of the Big Red Apple
Her Peaches Unexcelled in Flavor & Color
Her Berries and Grapes Grow to Perfection
CROP FOR 1897 SOLD FOR 18.000.000
OVER 30.000.000 TREES IN ORCHARDS
MISSOURI
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MISSOURI STATE APPLE SHOW AT OMAHA, 1898.

FORTY-FIRST ANNUAL REPORT

83101

OF THE

STATE HORTICULTURAL SOCIETY
OF MISSOURI.

MEETINGS AT

West Plains, June 7, 8, 9, and Columbia, December 6, 7, 8, 1898.

L. A. GOODMAN, Secretary,
WESTPORT, MO.

JEFFERSON CITY, MO.:
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1898.

MISSOURI STATE HORTICULTURAL SOCIETY.

To His Excellency, LON V. STEPHENS, Governor:

This report of our Society work, of the meetings held, of the Omaha Exhibit, of the moneys expended and of the local societies and counties reporting for the year 1897 is respectfully submitted.

L. A. GOODMAN, Secretary,
Westport, Mo.

City of Jefferson, December 22, 1898.

To the Commissioners of Public Printing:

I require for the use of my office Four Thousand copies of Missouri State Horticultural Society Report for 1898—Two Thousand to be bound in cloth and Two Thousand to be bound in paper—which I desire as per accompanying sample.

Respectfully,
L. A. GOODMAN, Secretary,
Westport, Mo.

Approved:
A. A. LESUEUR, Secretary of State.
J. M. SEIBERT, State Auditor.
F. L. PITTS, State Treasurer.

Officers For The Year 1898.

Governor LON V. STEPHENS	Ex-Officio Member of Executive Committee
N. F. MURRAY, President	Oregon
D. A. ROBNETT, Vice-President	Columbia
SAMUEL MILLER, Second Vice-President	Bluffton
L. A. GOODMAN, Secretary	Westport
A. NELSON, Treasurer	Lebanon

List of Honorary Life Members.

R. H. JESSE, President State University	Columbia
HON. A. A. LESUEUR, Secretary of State	Jefferson City
J. C. EVANS,	Harlem
MISS M. E. MURTFELDT	Kirkwood
GEORGE HUSSMAN	Napa, Cal.
T. T. LYON	South Haven, Mich.
C. W. MURTFELDT	Kirkwood
HON. N. J. COLMAN	St. Louis
SAMUEL MILLER	Bluffton
PROF. M. G. KERN	St. Louis
PROF. B. T. BUSH	Independence
PROF. B. T. GALLOWAY	Washington, D. C.
CONRAD HARTZELL	St. Joseph
H. E. VAN DEMAN	Parksley, Va.

List of Life Members.

WM. MUIR, old member	Fox Creek
H. CLAGGETT, old member	Kansas City
J. C. EVANS	Harlem
L. A. GOODMAN	Westport
D. M. DUNLAP	Fulton
D. A. ROBNETT	Columbia
CHAS. HUBER	Seneca
C. H. EVANS	St. Louis
W. R. WILKINSON	Altenburg
H. M. WHITNER	Fredericktown
RIGHT REVD. J. J. HOGAN	Kansas City

STANDING COMMITTEES.

Orchards.

D. A. ROBNETT, Columbia.
W. E. LILLY, Chillicothe.
W. H. PARK, Springfield.

Vineyards.

JACOB ROMMEL, Morrison.
F. McCOUN, St. Joseph.
J. T. SNODGRASS, West Plains.

Small Fruits.

G. W. HOPKINS, Springfield.
J. N. MENIFEE, Oregon.
HENRY SCHNELL, Glasgow.

Stone Fruits.

W. A. GARDNER, Olden.
Z. T. RUSSELL, Carthage.
ARTHUR PATTERSON, Kirksville.

Vegetables.

C. M. WILLIAMS, Marceline.
J. M. PRETZINGER, Clinton.
J. K. SAUNDERS, Pierce City.

Flowers.

E. H. MICHEL, St. Louis.
MRS. G. E. DUGAN, Sedalia.
C. I. ROBARDS, Butler.

Ornamentals.

GEO E. KESSLER, Kansas City.
PROF. H. C. IRISH, St. Louis.
R. E. BAILEY, Fulton.

Entomology.

MISS M. E. MURTFELDT, Kirkwood.
PROF. J. M. STEDMAN, Columbia.

Botany.

PROF. G. C. BROADHEAD, Columbia.
B. F. BUSH, Indendence.
GEO. RAUPP, Monett

Nomenclature.

W. G. GANO, Parkville.
J. C, EVANS, Harlem.
HENRY SPEER, Butler.

New Fruits.

SAMUEL MILLER, Bluffton.
J. F. WILCOX, St. Joseph.
A. H. GILKESON, Warrensburg.

Ornithology.

O. WIDMAN, Old Orchard.
C. W. MURTFELDT, Kirkwood.
C. HOWARD, Willow Springs.

Injurious Fungi.

PROF. J. C. WHITTEN, Columbia.
PROF. W. TRELEASE, St. Louis.

Packing and Marketing Fruits.

E. T. HOLLISTER, St. Louis.
H. E. MOSELY, Olden.
HENRY ADKINS, Sarcoxie.

Transportation.

J. M. RICE, Sarcoxie.
C. C. BELL, Boonville.
L. A. GOODMAN, Westport.

Horticultural Education.

Chairman, G. B. LAMM, Sedalia.
L, A. GOODMAN, Westport.
PROF. J. C. WHITTEN, Columbia.
MRS. G. E. DUGAN, Sedalia.
MISS M. E. MURTFELDT, Kirkwood.
PROF. WM. TRELEASE, St. Louis.
PROF. J. R. KIRK, Jefferson City.

MISSOURI STATE HORTICULTURAL SOCIETY.

Organized January 5, 1859, at Jefferson City.

INCORPORATION AND REORGANIZATION OF THE HORTICULTURAL SOCIETY BY AN ACT OF THE GENERAL ASSEMBLY IN 1893.

The following law was passed by the last Legislature incorporating the State Horticultural Society. The Executive Committee met soon after the passage of this act and accepted its provisions, and at the semi-annual meeting of the Society at Columbia, June 6, 7, 8, 1893, the act was adopted as part of the constitution of the Society.

MEMBERSHIP.

Under the new constitution the law requires the payment of $1 per year for membership fee. Life membership, $10.

L. A. Goodman, Secretary.

ACT OF THE GENERAL ASSEMBLY.

The Missouri Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succession, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

The Missouri State Horticultural Society shall be composed of such persons as take an interest in the advancement of Horticulture in this State, who shall apply for membership and pay into the Society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri State Horticultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the State treasury. The business of the Society, so far as it relates to transactions with the State, shall be conducted by an Executive Board, to be composed of the President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at an annual meeting of the Society. The Governor of the State shall be ex-officio a member of the Board—all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the Board on the State Auditor, signed by the President and Secretary and attested with the seal; and the Treasurer shall annually publish a detailed statement of the expenditures of the Board, covering all moneys received by it. The Public Printer shall annually, under the direction of the Board, print such number of the reports of the proceedings of the Board, Society and auxiliary societies as may, in the judgment of the State Printing Commission, be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than 400 pages. The Secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the Board.

CONSTITUTION.

ARTICLE I. This association shall be known as the Missouri State Horticultural Society. Its object shall be the promotion of horticulture in all its branches.

ART. II. Any person may become a member of this Society upon the payment of one dollar and membership shall continue upon the payment of one dollar annually. Provided, however, that no member shall be allowed to vote on a question of a change of the constitution or the election of officers of this Society until after they have been a member for a period of one year preceding the time of election, except in case of a life member.

The payment of ten dollars at any one time shall constitute a person a life member and honorary members may be elected at any regular meeting of the Society; and any lady may become a member by giving her name to the Secretary.

ART. III. The officers of this Society shall consist of a President, Vice-President, Second Vice-President, a Secretary and a Treasurer, who shall be elected by ballot at each regular annual meeting, and whose term of office shall begin on the first day of June following their election.

ART. IV. The elective officers of this Society shall constitute an Executive Committee, at any meeting of which a majority of the members shall have power to transact business. The other duties of the officers shall be such as usually pertain to the same officers in similar organizations.

ART. V. The regular meetings of this Society shall he held annually on the first Tuesdays in December and June; except when otherwise ordered by the Executive Committee. Special meetings of the Society may be called by the Executive Committee, and meetings of the committee by the President and Secretary.

ART. VI. As soon after each regular annual meeting as possible, the President shall appoint the following standing committees, and they shall be required to give a report, in writing, under their respective heads, at the annual and semi-annual meetings of the Society, of what transpires during the year of interest to the society: Orchards, Vineyards, Stone Fruits, Small Fruits, Vegetables, Flowers, Ornamentals, Entomology, Ornithology, Botany, Nomenclature, New Fruits, Injurious Fungi, Packing and Marketing Fruit and Transportation.

ART. VII. The Treasurer shall give a bond in twice the sum he is expected to handle, executed in trust to the President of this Society (forfeiture to be made to the Society), with two or more sureties, qualifying before a notary public, of their qualifications as bondsmen, as is provided by the statute concerning securities.

ART. VIII. This constitution may be amended by a two thirds vote of the members present at any regular meeting.

HOW TO ORGANIZE A HORTICULTURAL SOCIETY, ALSO THE CONSTITUTION FOR A LOCAL ORGANIZATION.

Anyone much interested on this subject of Horticulture can organize a society if he will speak to five or six different persons who are known to be prominent in this matter. Tell them that there ought to be a society in your county, and as it is such a good fruit country, ask them if they do not want to help organize one. You will hardly meet a refusal, but will be met with the remark "that they do not believe there is interest enough in your county to keep one up." Never mind this, but make an appointment to meet in some office in town on some Saturday. If you can get five to come together, organize and elect officers. Make the meetings regular each month and on the same Saturday. Some lawyer will let you have the use of his room to hold the meetings. Have the meeting in the best town in the county even if you have to go some distance to meet there. Talk this up until the next meeting, and let each one promise to bring another. Do not expect to have everyone belong, for they will not. Hold six winter meetings (November to April) in the city or village, and at the March or April meeting, select the places to hold the six summer meetings (May to October) at the homes of the members. Make this a picnic dinner, meeting about 10 o'clock, and after the dinner, hold the meeting and discussion; offer a few premiums for fruits and flowers, and have a general good time. Do not be afraid of a dollar or two, but use as much judgment in this matter as you would in any business of your own, and you will succeed. Talk to your neighbors about it if they are interested in fruit-growing, if not, choose those who are so interested. They will not be much help to you if they are not fruit-growers. Make out a programme for the year, choosing one or two for an essay at each meeting. When the reports of the standing committees are made, have it done in writing, and have a report at every meeting. You can not expect to have everything work in complete order at first, and do not get discouraged if you find trouble at the start. Take your wives with you and make a good social time also. If I can be of use to you at any time, I will come and visit you if it is possible for me to get away. I will try and bring someone with me also to help along the good work.

L. A. GOODMAN,
State Secretary.

CONSTITUTION.

ARTICLE I. This association shall be known as the —— Horticultural Society.

ART. II. All persons interested in the subject of Horticulture may become members of this Society by signing the Constitution and paying annually to the Treasurer the sum of one dollar: And provided further, that any person paying at one time the sum of ten dollars to the Treasurer, may become a life member, and thereafter exempt from annual dues: Provided further, That all ladies may become members by signing the Constitution without the payment of one dollar.

ART. III. SECTION 1. The officers of this Society shall consist of a President, Vice-President, Secretary, Treasurer and Executive Committee, consisting of five, of which the President and Vice.President shall be ex officio members.

SEC. 2. The president shall exercise a general superintendence of the affairs of the Society; preside at all meeting of the Society; appoint all committees unless otherwise provided; draw all orders on the Treasurer as directed by the Society; call special meetings of the Society or Executive Committee when deemed necessary; he shall be ex officio President of the Executive Committee.

Sec. 3. The Vice-President shall assist the President, and in his absence, perform his duties, and be ex officio a member of the Executive Committee.

SEC. 4. The Treasurer shall receive all moneys belonging to the Society; shall keep a just and true account of the same, from what source received, and pay out the same upon the order of the President, countersigned by the Secretary. At the meeting of the Society on the —— Saturday in December in each year (or oftener, if required by the Executive Committee), he shall make a full and complete report of all receipts and disbursements, and at the expiration of his term of office, turn over all books, papers, and all money or other property belonging to the Society, to successor in office. The Treasurer, before entering on the discharge of the duties of his office, shall enter into a bond with sufficient security, to be approved by the President of the Society for its use, in the sum of ———, conditioned for the faithful performance of the duties required of him in this section.

SEC. 5. The Secretary shall keep a full and complete minute of each meeting of the Society, and the proceedings of the Executive Committee. He shall receive and safely keep all books, periodicals, stationery, seeds, fruits and other like property of the Society subject to its order; shall correspond as may be necessary with all persons or societies as the welfare of the Society may demand. He shall report all the proceedings of the Executive Committee to the Society at its first meeting thereafter. He shall countersign all orders drawn upon the Treasurer by the President under the direction of the Society, and have the care and custody of the seal of the Society.

SEC. 6. The Executive Committee shall assist and advise the officers in the discharge of their duties; prepare all premium lists; make all necessary arrangements for holding and conducting any and all such fairs as the Society may determine to hold, and such exhibitions of fruit as the Society may determine to make, and exercise a general supervision over the same, and generally to provide for the arrangements and business of the Society.

ART. IV. The officers of this Society shall be elected by ballot from among its members for the term of one year. The annual election shall be held at the regular meeting of the Society on the —— Saturday in December, where the general business of the Society shall be transacted. Vacancies may be filled at any regular meeting of the Society.

ART. V. The regular meeting of this Society shall be held on the —— Saturday of each month, at 1 o'clock p. m., at such places as the Society may select, at ————: Provided, that the meetings in the months of May, June, July, August, September and October of each year may, by a vote of the Society, be held at the residence of any of the members outside of the city.

ART. VI. Executive Committee may provide: First, for the payment of premiums to members of the Society for the best display of fruit, flowers or vegetables made at any regular meeting of the Society; second, for essays on any subject of interest to the Society, and arrangement of programme for the year; third, and for determining the places for each meeting of the Society for the months of May to October, inclusive.

ART. VII. Five members or the Society shall constitute a quorum at any meeting, and three members of the Executive Committee shall be authorized to transact business at any meeting of the committee duly called. Special meetings of the Society or Executive Committee may be held by order of the President or any three of the committee on one week's notice to all members of the Society or Board (as the case may be), given personally, or through the postoffice. Adjourned meetings may be held from time to time, as the Society may determine.

ART. VIII. The funds of this Society shall not be appropriated to any purpose without a vote of a majority of the members present at any regular meeting of the Society.

Art. IX. This Society shall have the following standing committees, which shall be appointed by the President at the January meeting in each year: Small Fruits, Stone Fruits, Orchards, Vineyards, Vegetables, Flowers, Ornamentals, Entomology, Botany, to each of which shall be referred all matters relating to those particular subjects. Each of said committees shall consist of one to three members.

Art. X. This Constitution may be amended by a two-thirds vote of all the members of the Society at any regular meeting: Provided, that notice of the intentioned amendment shall have been given at least one month prior to any action taken thereon.

Art. XI. The meetings of this Society shall be governed by the parliamentary rules usual for deliberative bodies.

LIST OF COUNTY SOCIETIES.

Adair County Horticultural Society—
R. M. Brasher, Pres't, Kirksville.
A. Patterson, Sec'y, Kirksville.

Atchison County Horticultural Society—
C. W. Coe, Pres't, Tarkio.
R. Lynn, Sec'y, Tarkio.

Audrain County Horticultural Society—
M. B. Guthrie, Pres't, Mexico.
K. B. Wilkerson, Vice-Pres't, Mexico.
R. A. Ramsey, Sec'y, Mexico.
W. G. Huton, Ass't Sec'y, Mexico.
Wm. Eagan, Ass't Sec'y, Mexico.
W. M. Pearson, Treas., Mexico.

Barry County Horticultural Association—
W. W. Witt, Pres't, Exeter.
G. G. James, Sec'y, Exeter.
J. C. Crane, Treas., Exeter.

Barton County Horticultural Society—
C. Fink, Pres't, Lamar.
B. D. Hayes, Sec'y, Lamar.

Bates County Horticultural Society—
C. I. Robards, Pres't, Butler.
Henry Speer, Sec'y, Butler.

Birch Tree Fruit Growers' Ass'n, Shannon County—
Jas. Kirkendal, Pres't, Birch Tree.
F. Anderson, Sec'y, Birch Tree.

Bismarck Fruit Growers' Association—
J. A. Sebastian, Pres't, Bismarck.
M. H. Dowling, Sec'y, Bismarck.

Boone County Horticultural Society—
D. A. Robnett, Pres't, Columbia.
Jos. Baumgartner, Sec'y, Columbia.
G. W. Bouroughs, Treas , Columbia.

Buchanan County Horticultural Society—
J. H. Karnes, Pres't, St. Joseph.
F. McCoun, Sec'y, St. Joseph.

Butler County Horticultural Society—
D. C. Kitteridge, Pres't, Poplar Bluff.
E. R. Lentz, Sec'y, Poplar Bluff.

Butterfield Local—Barry County—
E. B. Utter, Pres't, Btterfield.
J. E. Utter, Sec'y, Butterfield.

Benton County, Ark, Horticultural Society—
C. J. Eld, Pres't, Bentonville.
J. C. Rucker, Vice-Pres't, Bentonville.
I. B. Lawton, Sec'y, Bentonville.
N. B. Cotton, Treas., Bentonville.

Callaway County Horticultural Society—
R. T. Murphy, Pres't, New Bloomfield.
R. E. Bailey, Sec'y, Fulton.

Camden County Horticultural Society—
J. W. Burnhans, Pres't, Stoutland.
J. C. Evans, Sec'y, Stoutland.

Central Missouri Horticultural Association—
David Edwards, Pres't, Boonville.
F. J. Boller, 1st Vice-Pres't, Boonville.
Mrs, John Durr, 2nd Vice-Pres't, Bonoville.
C. C. Bell, Sec'y, Boonville.
W. A. Smiley, Treas., Boonville.

Christian County Horticultural Society—
M. King, Pres't, Billings.
R. C. Hendricks, Sec'y, Billings.

Clay County Horticultural Society—
F. M. Williams, Pres't, Barry.
Oliver Chedister, Sec'y, Linden.

Cole County Horticultural Society.
J. B. Brooks, Pres't, Jefferson City.
T. M. Barker, Vice.Pres't, Centertown.
A. J. Davis, Sec'y, Jefferson City.
F. M. Brown, Treas., Jefferson City.

Conway Horticultural Society, Laclede County—
W. H. Getty, Pres't, Conway.
R. O. Hardy, Rec. Sec'y, Conway.

Gentry County Horticultural Society—
W. A. Garrett, Pres,t, Albany.
G. E. Adams, Sec'y, Albany.
Wm. David, Treas., Albany.

Goodman Hort. Society, McDonald County—
H. C. Blanchard, Pres't, Goodman.
E. H. Gurney, Sec'y and Treas., Goodman.

Green County Horticultural Society—
W. T. Zink, Pres't, Springfield.
A. W. Howell, Vice-Pres't, Springfield.
G. A. Atwood, Sec'y, Springfield.
H. H. Park, Treas., Springfield.

Henry County Horticultural Society—
M. L. Bonham, Pres't, Clinton.
H. C. Green, Vice-Pres't, Clinton.
J. M. Pretzinger, Sec'y, Clinton.
H. F. Burris, Treas., Clinton.

Holt County Horticultural Society—
N. F. Murray, Pres't, Oregon.
J. N. Menifee, Vice-Pres't, Oregon.
S. Blenchard, Sec'y and Treas., Oregon.

Jasper County Horticultural Society—
F. A. Hubbard, Pres't, Carthage.
Th. Betebenner, Vice-Pres't, Carthage.
Z. T. Russell, Sec'y, Carthage.

Koshkonong Hort. Society, Oregon County—
T. M, Culver, Pres't, Koshkonong.
C. M. Alderson, Sec'y, Koshkonong.
H. C. Huxley, Treas., Thayer.

Laclede County Horticultural Society—
A. Nelson, Pres't, Lebanon.
C. L. Palmer, Sec'y, Lebanon.
D. R. Diffenderffer, Treas., Lebanon.

Lafayette County Horticultural Society—
H. Turlenius, Pres't, Alma.
G. H. Robius, Sec'y, Mayview.

COUNTY SOCIETIES—Continued.

Lawrence County Horticultural Society—
W. T. Seward, Pres't, Marionville.
B. Logan, Sec'y, Marionville.
J. B. Logan, Treas., Marionville.

Lincoln County Horticultural Society.
A. H. Kercheval, Pres't, Elsberry.
B. C. Benedict, Sec'y, Moscow Mills.

Linn County Horticultural Society—
A. P. Swan, Pres't, Marceline.
H. D. Porter, Vice-Pres't, Marceline.
Hiram Long, Sec'y, Marceline.
I. W. Porter, Treas., Marceline.

Livingston Horticultural Society—
G. A. Smith, Pres't, Chillicothe.
J. T. Jackson, Sec'y, Chillicothe.

Madison County Horticultural Society—
A. A. Blumer, Pres't, Sec'y, Fredericktown.
H. M. Whitner, Sec'y, Fredericktown.

Meramec Horticultural Assin Crawford County—
E. R. Bowen, Pres't, Steelville.
Peter Lovengood, Vice-Pres't, Steelville.
Jos. Marsh, Sec'y, Steelvilie.
K. D. Norval, Ass't Sec'y, Steelville.
Chas. Lay, Treas., Steelville.

Mercer County Horticultural Society.
H. R. Wayman, Pres't, Alvord.
J. A. Kennedy, Sec'y, Ravanna.

Miller County Horticultural Society—
John Vetter, Pres't, Eldon.
E. M. Sumptain, Vice-Pres't, Spring Garden.
N. J. Shepherd, Sec'y, Eldon.
J. R. Helfrich, Treas., Eldon.

Missouri-Arkansas Horticultural Society—
D. S. Helvern, Pres't, Mammoth Springs, Ark.
P. P. B. Hynson, Sec'y, Mammoth Springs, Arkansas.

Missouri Valley Horticultural Society—
Homer Reed, Pres't, Kansas City.
Clarence Holsinger, Vice-Pres't, Kansas City.
C. A. Chandler, Sec'y, Argentine, Kan.
G. F. Espenlaub, Treas., Rosedale, Kan.

Monett Local—Barry County—
R. D. Creed, Pres't, Monett.
Geo. Raupp, Sec'y, Monett.

Montgomery County Horticultural Society—
F. Gutman, Pres't, Hugo.
C. Hausser, Sec'y, Hugo.

Mound City Horticultural Society—
D. B. Browning, Pres't, Mound City.
J. M. Hasness, Sec'y, Mound City.

Neosho Fruit Growers and Shippers Association, (Newton County)—
T. P. Price, Pres't, Neosho.
R. P. Liles, Vice-Pres't, Neosho.
F. H. Speakman, Sec'y, Neosho.
Scott Ferris, Treas., Neosho.

Norwood Horticultural Society—
J. W. Hollenbeck, Pres't, Norwood.
W. S. Calhoun, Sec'y, Norwood.

Pettis County Fruit and Dairy Club—
Ed. Brown, Pres't, Sedalia.
G. B. Lamm, Sec'y, Sedalia.
J. H. Monsees, Treas., Beamon.

Phelps County Horticultural Society—
Robert Merriwether, Pres't, Rolla.
Albert Newman, Sec'y, Rolla.

Pierce City Fruit Growers' Association, Lawrence County—
E. L. Parker, Pres't, Pierce City.
J. G. Morris, Vice-Pres't, Pierce City.
J. K. Saunders, Sec'y, Pierce City.
J. B. Jones, Treas., Pierce City.

Polk County Horticultural and Agricultural Association—
G. W. Williams, Pres't, Humansville.
C. M. Briggs, Sec'y, Humansville.
A. H. Schofield, Treas., Humansville.

Polk County (Ark.) Horticultural Society—
A. W. St. John, Pres't, Mena, Ark.
D. H. Hopkins, vice-Pres't, Dallas, Ark.
F. S. Foster, Sec'y, Mena, Ark.
G. S. Graham, Treas., Dallas.

Pulaski County Horticultural Society—
A. W. Rausch, Sec'y, Richland.

Republic Horticultural Society, Greene County—
W. O. Wade, Pres't, Republic.
W. E. Goodwin, Vice-Pres't, Republic.
T. B. Wallace, Sec'y and Treas., Republic.

Randolph County Horticultural Society—
B. H. Boucher, Pres't, Cairo.
G. N. Ratliff, Vice-Pres't, Moberly.
J. W. Dorsey, Treas., Moberly.
C. W. Halliburton, Sec'y, Moberly.

Ripley County Horticultural Society—
J. G. Hancock, Pres't, Doniphan.
S. S. Hancock, Sec'y, Doniphan.

St. Francois County Horticultural Society—
R. C. Tucker, Pres't, Farmington.
W. F. Hoey, Sec'y, Farmington.

Saline County Horticultural Society.
J. T. Stewart, Pres't, Blackburn.
Thos. Adams, Sec'y, Marshall.

Sarcoxie Horticultural Association—
W. T. Burkholder, Pres't, Sarcoxie.
John Johnson, Vice-Pres't, Sarcoxie.
J. B. Wild, Sec'y, Sarcoxie.
H. B. Boyd, Treas., Sarcoxie.
J. W. Haggard, Manager, Sarcoxie.

Seligman Local—Barry County—
G. W. Roler, Pres't, Seligman.
H. M, Foster, Sec'y, Seligman.

COUNTY SOCIETIES—Continued.

Shannon County Horticultural Society—
C. G. Hille, Pres't, Monteer.
Jos. Holt, Sec'y, Monteer.

South Mo. Fruit Growers' Ass'n, Howell County—
Geo. Comley, Pres't, Willow Springs.
J. Lovewell, Sec'y, Willow Springs.

South Mo. Hort. Ass'n, Howell County—
D. J. Nichols, Pres't, West Plains.
J. W. Hilt, Vice-Pres't, West Plains.
J. T. Snodgrass, Sec,y and Treas., West Plains.

Tri-County Horticultural Society—
J. H. Holloway, Pres't, Richland.
S. Kellar, Sec'y, Richland.

Union Horticultural Society—
E. S. Link, Pres't, Jefferson City.
D. A. Robnett, Vice-Pres't, Columbia.
A. J. Davis, Sec'y, Jefferson City.

Vernon County Fruit Growers' Association.
J. D. Bowman, Pres't, Nevada.
J. Kennedy, Vice-Pres't, Nevada.
W. H. Litson, Jr., Sec'y, Nevada.
W. B. Smith, Treas., Nevada.

Washburn Local—Barry County—
H. J. Wood, Pres't, Washburn.
G. K. Hurd, Vice-Pres't, Washburn.
J. D. Berryhill, Sec'y, Washburn.
J. J. Hickman, Treas., Washburn.

Wayne County Horticultural Society—
W. C. Mulherin, Pres't, Chaona.
John Ware, Sec'y, Wappapello.
Jacob Fry, Treas., Wappapello.

Wright County Horticultural Society—
G. S. Killam, Pres't, Mt. Grove.
B. S. Snyder, Vice-Pres't, Mt. Grove.
J. A. Clay, Vice-Pres't, Mt. Grove.
J. P. Cawdin, Vice-Pres't, Mt. Grove.
Mrs. A. Z. Moore, Sec'y, Mt. Grove.
Mrs. C. Brooker, Treas., Mt. Grove.

SUMMER MEETING.

Held at West Plains, Mo., June 7, 8 and 9, 1898.

STATE HORTICULTURAL MEETING.

First session, Tuesday evening.

The semi-annual meeting of the society was called to order by President J. C. Evans, and in a short talk he said: "I am happy to-night in the thought that such an audience assembles here in this beautifully decorated hall for our meeting; and I offer my congratulations on behalf of this Society, to the people of the Ozarks at the progress shown, not only in churches and schools which have sprung up over these parts, but also in the fruit farms, both large and small which have been, and are now being, planted among these hills."

The opening prayer was then offered by the Rev. W. R. McElroy.

Mayor M. B. Ramsay welcomed the Society to the Gem City of the Land of the Ozarks, the Land of the Big Red Apple, and said: "The keys of our city are yours."

Words of welcome were also spoken by W. B. Clark:—"It is my pleasant duty to extend to you Mr. President, and to the members of the Missouri State Horticultural Society, an official welcome on behalf of the Mayor, the aldermen and citizens of this Gem City. The town is wide open for you. We are the people who have derived great benefit from your enterprise. Like a ship at full sail, leaving a broad wake behind, you, besides accomplishing your definite aims, leave widespread influence where you go. You set out trees and vines and a line of prosperity follows you. It is the unearned increment that we get. We are glad to have you among us. The only thing that might be of benefit in horticulture that I can tell is that I picked strawberries at three cents a box in the sandy hills of Connecticut, but here they are only one and a half cents. Then, however, the bottom of the box was in the bottom of the box, so the discrepancy is not so great as might at first appear. In this Age of Progress the bottom will get to the top. This does not reflect on the horticulturist but on the produce commission man. Besides berries used to be fifteen cents a box, where now they are only three or four, so there is still no discrepancy, I suppose.

"You men are pioneers, and fruit growing is a money making business, and I wish you success in this horticultural meeting and in all your fruit-raising."

W. A. Gardner spoke on behalf of the fruit raisers.

Mr. President, Ladies and Gentlemen:—It is with no small degree of pleasure that I, in behalf of the fruit growers of this section, welcome the members of the Missouri State Horticultural Society and its friends, to the Gem City of the Ozarks.

This Society from small beginnings has grown to be a power in Horticultural circles, not only in this State for its work and influence extends past its boundaries, into all the fruit growing sections of the country, as scientific investigations have advanced this Society has kept pace. The object of these meetings is to confer upon the best methods of Horticultural work and to exchange ideas and experiences.

In order to form correct opinions it is necessary to know essential facts. Each year's experience adds to our knowledge of controlling facts. The beginning of wisdom in any branch of science, is the gathering of essential facts. The essence of wisdom, is discrimination. The best of wisdom is the attaining of practical beneficial results from the judgment upon the fact acted upon. It sometimes takes years to get an essential fact recognized and many of the facts now controlling horticultural science have been established after years of controversy, and persistent effort.

A short time ago only a few persons were engaged in scientific investigation relative to Horticultural development. The result of these investigations proved so valuable that now scientific men are engaged in nearly every State of the Union upon special work for the advancement of the agricultural sciences. Horticulture is one of the branches of agriculture. The work of these specialists is gathered in pamphlets. The agriculturalist has neither the time nor the means to carry on to any great extent, scientific investigations, but, it is his fault, if he does not have these important pamphlets at hand to which he may refer and in a few moments possess himself of the facts, which some one else may have spent years to learn, and possessing the essential facts he may at once deduct as perfect conclusions as the scientists themselves. The importance and value of these pamphlets, and the work of the State institutions fostered by the Government, is only beginning to be appreciated by those engaged in agricultural pursuits. At this meeting it is our privilege to have with us the scientists of our State institutions to instruct us and to act as judges of the various questions which arise, a privilege the founders and upbuilders of this society for many years did not enjoy, and it is due to their efforts that we have them with us. No effort on the part of the members of this society should be spared to aid our scientists in obtaining the means with which to further their investigations.

A small tax would help on this work and we trust that at the next meeting of the legislature this work may receive its due recognition. That our scientists are welcome at these meetings it is not necessary for me to state, that goes without saying—my regret is that, in welcoming you here we can not give you the assurance that at least a hundred thousand dollars will be appropriated at the next meeting of the legislature to assist you. Your work has been a credit to our State and we congratulate you upon it.

We greet and welcome those who have come as the representative of the heralds of the knowledge here to be obtained, and appreciate the importance of, and high class of work furnished in your journals. May your visit be as pleasant as I am sure it will be profitable to you.

When some new benefit to the public has been suddenly brought into use the author of it, is looked upon as a hero and his fame is spread abroad through the length and breadth of the land. That which we have seen gradually grow into usefulness and perfection by the efforts of its originator or originators, is often passed by and persons deserving of great credit are lost sight of in a busy selfish world. Some day after such ones have passed to the stars, someone discovers that they were public benefactors, monuments are erected to their memories and their praises sung; if only a small share of the glory could have been given them in life, which was accorded after they had passed away, what joy would have been theirs, lightening and lifting burdens and cares as it went out. The evidences of the importance and grand results attained by the Missouri State Horticultural Society, are here present and are so many of its founders. There could be no better time than this, while, trees are showing their fruit, while the flowers are growing in profusion, nor no better place, the very garden of a great fruit growing State, in its Gem City; in this hall crowded with appreciative people, to symbolize the good, the beauty and the power of your achievements.

The Ancients crowned their public benefactors with wreaths of laurels. You, Mr. Evans, who have weilded the gavel for so many years, now to be laid down by your desire, and your conferers, Mr. Nelson, Mr. Goodman, Mr. Murray, Judge Samuel Miller, Miss Murtfeldt, you and others with whom I am not so well acquainted, have proven yourselves public benefactors—we are going to recognize you as such in bidding you welcome here, by crowning you; not with diadems got from the worlds sordid marts with which we read in story Kings and Queens of other lands are crowned, for it is our glory to be free to share our people's love, a priceless gem, who wins it wants no diadem. We welcome you here with a true heartfelt welcome and crown you with wreaths of bay, plucked from the bright, sweet arbors of appreciative minds and woven together with the tough fibers of the heart. May there be no other feeling or actions manifest here, except those which betoken the truest, most unselfish manhood, reflecting honor upon this society, as it reflects our kinship to the All Wise author of our being, from whom alone comes every good and perfect gift.

The response of welcome was delivered by N. F. Murray, president-elect.

Ladies and Gentlemen:—In responding to the eloquent addresses of welcome by the worthy gentlemen who have preceded me, I can assure you that it affords me great pleasure, as the representative of this Society, to return to the local horticultural society and to the citizens of West Plains our hearty thanks for the invitation to hold the June meeting here and for the warm and generous welcome you have given us to the freedom of your beautiful city, and the hospitality of your homes. We are not surprised at this for we still have a vivid recollection of our first meeting with you eleven years ago to-night and of your kind greeting on that occasion. We also remember our promise that we would come at some future time to see what progress you have made and for an exchange of ideas and lessons learned in eleven years of work and study in the field of horticulture, and to-night we have come to redeem our promise. In our trip down along the line of the Memphis Route we were agreeably surprised to notice on either hand the wonderful change that has been wrought. Many thousands of acres of what was then a woodland wilderness have been converted into fruitful orchards and happy homes, and we are gratified to find the prediction we then made, that in time the "Big Red Apple" and luscious peaches of the Ozarks would go by the train load east, west, north and south, has become a historical fact. But while we could not but rejoice with you over what you have accomplished, and while it is a pleasure to look over your fine orchards, yet pleasure seeking, however desirable, is not the object for which this Society was organized or the mission for which we, as representatives of that organization, convene with you on this occasion. We come as a matter of duty, we come to encourage you to continue the good work so well inaugurated by our worthy pioneer fruit growers.

But before I speak further of our work before us I desire to give some statistics showing the growth of horticulture in the United States. In 1800 we had two nurseries, one in New York and one in Connecticut. In 1850 we had thirty-two. In 1895 we had 4,510, with an invested capital of $52,000,000, employing 45,000 men and 2,000 women. New York leads, then comes California, Illinois, Pennsylvania and Ohio, and Missouri stands sixth in line of nursery stock, although she is almost first in the production of fruit. With all these vast nurseries before us and the great orchards that are being planted, the same old question of over-production comes to the front for our consideration. For my own part I have no fear whatever of an over-production of good standard fruits. We have at least 300,000 farms in Missouri. Counting each to have 135 trees, certainly a reasonable number when we include all varieties, then it would require over 40,000,000 of trees to plant them once. As they must be renewed every twenty years, this will require an annual planting of 2,000,000, counting all to grow, but not more than one in three will make a bearing tree, so it will require 6,000,000 every year to keep up our present acreage.

According to Warder, in 1867 the total fruit crop of the United States was a little less than $20,000,000. Now, after the lapse of thirty years, we find that the population has doubled once, but the increased production of fruit in the same time has been at least fivefold and yet the price in general will average as high as formerly, and it is easier now to sell 10,000 barrels of apples than it was to sell a wagon load forty years ago. And why? Because fifty years ago the larger part of the country west of the Mississippi river was an unorganized territory and marked on the map as the great American desert. But look and behold the change that has been wrought in half a century. At present we find within its borders twenty states and four territories, containing a population of more than 20,000,000 and wealth double that of Spain and Portugal combined. With the same density of population as Ohio it would contain 300,000,000 people, or fifteen times its present population.

Here then in this great empire of unknown possibilities, in the wheat producing region of the Northwest, in the gold fields of Alaska, in the cotton fields of the South, in the cane fields of Cuba, (when she is free from the barbarous rule of Spain and takes her place beneath the starry emblem of human liberty), in the populous cities of the east, and among the fruit hungry millions of the old world, will be found a market for all the fruit that Missouri can grow at remunerative prices, and this Ozark country, so naturally adapted to fruit growing, seems to have been designed by the Creator for the production of large quantities of fine fruit to supply these markets, and here is the best opportunity for safe and profitable investments in all the world.

Surrounded as we are with so many natural advantages, no one who is willing to work need be out of a job, but may by industry, economy and perseverance, secure a piece of our cheap fruit land, which, when developed, will insure them a competency in old age. And let us remember that the American home is the school of patriotism, the cradle of liberty, the bulwark of our republican institutions, and those who make and build up such homes are benefactors to our race.

So, young man and young woman, go to work, in a prudent, businesslike manner, join the horticultural society, learn all you can from the study of the best books and papers on horticulture, get in love with your work, with your fruit trees and flowers, and if you fall in love with each other and go into partnership in making one of these American homes it will be all right.

> "For the world hath its delights and its delusions, too,
> But home to calmer bliss invites, more tranquil and more true."

A vocal solo, Happy Days, by Miss Laura Nelson, of Lebanon, Mo., was finely rendered.

PRESENTATION TO PRESIDENT EVANS.

At this juncture there was a departure from the program. A. Nelson, treasurer of the society. took the floor and made the following speech:

President Evans, as you are about to turn over to your successor the emblems of your office, our society has delegated to me a pleasant duty. I find in looking over the records of our State Horticultural Society, that you have been associated with it in its labors over a fifth of a century. What a work has been done in advancing the interests of Horticulture in that time. Grand men were in the work at that time as well as to-day, for I find such names as Coleman, Swallow, Elliott, Hussman, Marion, Edwards and many other active men, many of whom have laid down life's labors and gone to their reward. In looking over the history of the Society, I find that you have filled offices of honor and responsibility for twenty or more years. In that time and under your fostering care what a record has been made by you and your associates, the members of the society, and to-night I almost envy you the reputation you have made for yourself and society, and to-night you ought to be and should be one of the proudest, happiest men in Missouri. For you sir, and your associates being as it were the pioneers in that great, grand and noble work, have built for yourselves monuments all over the State of Missouri, and your work has not stopped in Missouri, but has reached and penetrated in to the great fruit belts of other states. I say to-night you should be proud of such a record; as you have built monuments on every hilltop and in every valley all over our state that will be as lasting as though carved in marble. But, President Evans, it is not only in the growing and marketing of our fine fruits that you have been a strong leader; but in showing our fruits in many of the largest cities of our country and in all cases coming off victorious. Here I again reiterate, you should be proud of your record that you have made for yourself, as well as for our State Society, and I believe I voice the sentiments of our Society when I say to you that we are proud of you and the great work you have done to advance the interests of Missouri. And in advancing Missouri interests, you at the same time advance the interests of all the true horticulturists whether active members of our Society and State or not. It is needless at this time for me to go into a detailed account of all the great and beneficial work that has been accomplished by you as President, and as a proof in part to you of the high esteem in which you are held by the Society you have presided over so long and so faithfully, allow me on behalf of them to present to you this beautiful Service of Silver. We present this to you, President Evans, not for its intrinsic value, but as a feeble expression of the great regard we feel for you. Again I repeat it, you may well be proud of the warm hearted, true friends you have here to-night, and the great work that has been done since you first occupied the chair of President of our Society. You also may be proud that as you retire from the office you so long have filled with credit and honor to yourself, as well as to our Society, that it is to be filled by one in every way worthy to be your successor. But in your retiring from the President's chair, we hope and trust your life may be spared for many years; that our Society and the Horticultural interests of the State may be still further benefited by your able counsel and advice. And now as a further token of the kind feelings of our Society to you as their retiring President, and their earnest desires for your welfare and prosperity, I give you the hand of the Society, wishing you Godspeed and hoping and trusting that you may long live to aid and guide by your counsel the best interests of the fruit gowers of Missouri.

At the proper words in the presentation the beautiful service on its tray was carried in by Miss Goodman, daughter of the Secretary, and Miss Nelson, daughter of the Treasurer, and set upon the table before President Evans.

In receiving this token Mr. Evans said: "It is unnecessary for me to make a long speech in acceptance. The best thing to me is that this is an evidence that the Society appreciates my work. I have always felt so and now I know it. Thirty-five years ago I presided over this meeting and after that occupied various offices until sixteen years ago when Mr. Goodman and myself were placed in our present places and have filled them till now. I am not glad to retire but I feel a weight of responsibility has been lifted from my shoulders. Mr. Murray, as Vice-President, worked hard and faithfully, and you elected him President, and I take pleasure in surrendering to him the chair and turning over to him the gavel, as emblem of this office. May it assure to the Society prosperity, harmony and peace and be wielded with firm and just moderation yet so as to effect good work with kindly feeling. I now conduct Mr. Murray to the seat of Presidency."

Mr. Murray after taking the chair, said: "I will try to govern to your good, ruled by the wise advice of President Evans, and to the continued growth of the fruit interests of our State; and I ask your loyal co-operation in all this work."

Recitation—"Christmas Night at the Quarters," by Miss Emma Evans, Harlem, Mo.

THE CAUSES OF VARIATION IN CULTIVATED PLANTS WHICH GIVE US NEW VARIETIES.

1. OUTLINE INTRODUCTORY.—Variations. What they are. Examples. Individuality of Plants as well as of Animals.

2. The Causes. These are in the nature of things usually small and unpronounced.

a. Chance Variations, i. e., Variations whose causes are unknown.

b. Cross breeding of Plants.

c. Changes in the physical surrounding of Plants, e. g.: climate, i. e., light, temperature and moisture, food supply, change of seed; Bud variation.

d. Struggle for life.

3. How these causes (known and unknown) may be used by man to create new varieties at will. Products of this method. What we may expect in the future. What private individuals may do. What experiment stations can do and the conditions for doing it.

Mr. President, Ladies and Gentlemen:

In selecting the title of my paper for this evening, I did so with the purpose of bringing together in condensed form some of the problems, and the causes operating in them, which are to-day the living problems of horticultural science as distinguished from the *art* or *practice* of horticulture. The science of horticulture is inseparable from that of living things in general or from Biological Science, so that, the rules of horticultural art, are mere applications of some of the truths of Botany.

As private individuals and as members of the Missouri State Horticultural Society you have, as your prime concern, the growing of the accepted "best varieties" of fruits for the market, for the money it brings you, and you do not, I dare say, as a rule, trouble yourselves with the questions of how these "best varieties" came to exist, and whether it is possible to get still more profitable ones—i. e., better ones than are yet known.

For this reason I shall ask your attention this evening to a brief survey of this very important field of horticultural work which lies for the most part outside of your every day occupations, but which, nevertheless, I hope you may find of interest on this occasion, lying as it does at the foundation of all horticultural progress as well as of all agricultural progress. And since all permanent advancement of human civilization depends absolutely upon food supply, it will be recognized how important those investigations are which promise release from even a part of the labor of providing food. Among the many plants now being studied and experimented with for the purpose, we may mention, wheat, the great breadstuff, the potato, the great vegetable, and the apple, the great fruit. Having made unconsciously during the past many improvements we now hope to create new and better varieties of cereals, better than anything our forefathers dreamed of.

It is perhaps well known to you that experiments are now under way at the Missouri Agricultural and Horticultural Experiment Station which aim at the creation of new (i. e. improved) varieties of Wheat, Potatoes, Strawberries, Asparagus, Peaches, Apples and various other plants of great commercial importance. The same may be said of many other stations and private gardens. We now have a beardless wheat the result of man's careful selections of seed, soil and climate. This variety represents the beginning of the betterment of this important cereal and the possibilities in this direction are practically unlimited.

What more important work can any man engage in than that of providing bread for his fellowmen? A new and greatly improved variety of wheat would mean two loaves where now we have one and with no increase in the expenditure of capital or labor. This result may seem to many too far away to be of practical interest to this generation; but it may safely be asserted that if the money and energy now being put into the art and equipments of war could be turned into the channels of science this and many more equally great accomplishments would quickly be added to the list of the humanitarian contributions of science to the general welfare of mankind.

As you have all known since childhood—potatoes grow below ground. We now hope to create Potato varieties which will bear white (not green) potatoes upon the stem above the ground.

How shall we accomplish this? At first blush it might seem a very difficult thing to do. But an examination will show it to be not as difficult as it appears. The potato tuber is an underground tem swollen and loaded with starch, and it developes in this position mainly for protective purposes—protection from animals and climatic changes. This condition of the plant is the result of natural selection. Frequently, however, I have myself observed on several occasions, potato plants with well formed tubers hanging to their sides very much like tomatoes, except that they are not the result of the growth of fertilized flowers, but simple enlargements of the stem—vegetative growths. The work will consist in encouraging plants that produce above-ground potatoes and in selecting those specimens that show evidence of lack of chlorophyl development. Such a potato would be of great economic worth in saving labor and giving access to the crop while growing.

After this digression let us return to the main question before us and ask ourselves; What is a variety?

What are the characters necessary to constitute a variety?

In horticulture every plant, be it tree, shrub or herb, is considered a variety if its fruits or flower or edible or beautitul part differs enough from other similar plants to attract special attention. And we all know how varieties of peaches and strawberries are distinguished by the shape, size and flavor of the berries or peach and how roses and hyacinths are distinguished by their shapes, color, odor and sizes. A variety is not the same as a species but is one of the series of forms which are included under some specific name. Thus the peach and apricot are different species, while the peach and nectarines are varieties of the fruit of the same plant species. Among the apples of the cultivated kinds known to us are probably varieties of one species. We know from historical and other evidence that the varieties of peaches and apples have increased very greatly in number while at the same time varieties once known have disappeared. Let us consider how this has come about.

The explanation of the phenomenon lies in the recognition of the causes of variation.

It is very probable that all varieties of recognized specific form, such as our apples, roses, etc., have been derived from a single sort growing in a wild state, and this statement is true as well of all cultivated plants as of plants in their uncultivated condition. This being true, we have before us everywhere the *fact* of variation which does not admit of doubt. What then are the causes of this variation? We know something of these causes and how they are involved in the production of new varieties, but much remains to be discovered, and upon these unknown problems of plant and animal variation a large number of the best scientists of the day are eagerly at work. Another fact of great importance which we can all observe is that of the individuality of plants. No two plants are alike and no two twigs or buds on a herb or tree are alike.

It will only be necessary to mention fruit buds and leaf buds as examples of two classes of buds borne by flowering plants. Attentive examination of a number of either kind in the bud condition or of the outgrowth from them, will convince any one that no two in either class are alike. Though the variations may appear unimportant to the casual observer it is upon such small initial variations that nature works to produce her wonderful results, and it is to these same slight variations that man must look for one great source of desirable variations of his cultivated plants whether trees or herbs.

On account of their almost complete lack of voluntary motion we are accutsomed to overlook the distinct individuality which is possessed by all plants as well as animals. In our attempts to improve the breed of animals we select the soundest individuals of known good breed, possessing the points desired, to use as the parents of prospective new and better individuals.

In plants we can do much the same thing only here the individuality is so scattered that each vegetative bud, as each flower bud, has an individuality all its own and may be used to breed improved individuals from. We thus see that plants, as for example a peach tree, lends itself with greater readiness to improvement than any of our domestic animals.

Our main shortcoming in this part of the field lies in the failure to recognize the bud and seed individuals of the tree, as the sufficient material for our careful study and selective breeding.

The appended table which is extracted from Thomas—American Fruit Culturist, 20th edition will illustrate what man has secured from the variability of horticultural plants. As examples of useful variations which he at present cultivates

We find listed not less than
1,000 recognized varieties of Apples,
250 recognized varieties of Peaches,
800 recognized varieties of Pears,
400 recognized varieties of Plums,
140 recoguized varieties of Cherries,
200 recognized varieties of Grapes,
45 recognized varieties of Blackberries,
126 recognized varieties of Raspberries,
22 recognized varieties of Gooseberries,
270 recognized varieties of Strawberries,
74 recognized varieties of Currants.

This list is far from complete even for the United States and the number would be greatly increased were all the varieties in the world added to it.

Among the known causes of variation in our cultivated plants are the subjection of the plant to different conditions of changes in atmospheric pressure due to altitude, temperature, light, moisture and the air, including all of the gasses, which help to form the aerial ocean, the bottom of which is formed by the earth's surface on which we live, and last but not least the soil with its numberless varieties, due on the one hand to its physical characters such as porosity, friability etc. and on the other hand to its chemical content which serves as food for plant growth or as a deterrent to the same. Plants acquire character of root, stem and leaf and consequently of bud and fruit, which are peculiar to dry, moist or wet localities, or to hot, warm or cold situations or too full sunlight, shade or deep shadow or to poor, fair or rich soils, or to heavy medium or mellow or loamy earth. And the endless variety of their adaption to set conditions is an evident response to their subjection to these conditions which vary in the same or different localities through the whole garment of chemical and physical composition.

For the varying relations of and proportions of heat, light, moisture, pressure, chemical and physical compostion of the air and soil cause the living protoplasm of the plant cells to react in accordance with these manifestations of energy and to record in the outward fixed appearances of the plant, i. e. in its form of leaf, size of stem, as a whole and of its flowers and color of its fruit, etc. the evidence of these stimuli thus applied to the living substance; and thus give us evidence which we may recognize by sight, taste, smell and feeling of the ever varying conditions of the plants which are subjected to these changes.

As I have already stated these changes are usually small and operate over long periods of time, for sudden and considerable changes generally suffice to destroy the plant.

Chance Variation—i. e. Variations whose causes are unknown are very common, as we might expect when we consider our comparatively limited knowledge of the results which are caused by the different combinations of the stimuli just mentioned. The following examples of variations caused by direct application of stimuli will serve, perhaps, to make my meaning plainer. Owing to the possession of voluntary motion and entire independence of the egg cell in animals it is much easier to study the changes effected in the growing animal organism by the application to it of the above mentioned stimuli.

Certain marine animals possessing superficial resemblances to plants, known as Hydroids or Polyps have been much experimented with in the endeavor to determine the force at work in their vital manifestations. It has been found that by varying the per cent of the several salts in solution in the sea water above or below the normal, these animals respond very quickly and grow into forms which if we did not know how they had arisen we would call by different names so considerable is the variation from their normal appearance. Again single eggs of the starfish or the sea urchins may be caused to grow into two, three or even more individuals or completely stopped in their growth by simply varying the proportions of the salts in the sea water in which they may live and grow. The *size*, *form* and *number* of the individuals may thus be varied at will. The field for similar experimentation with plants is large and full of promise of valuable results for the world of practical horticulture as well as for pure science.

Cross breading of Plants is a method commonly pursued by horticulturists and it consists in fertilizing the egg cell produced by one plant or distinct part of a plant with the sperm cell of the pollen grain from another plant or a distinct part of the same plant.

Scientists are generally agreed that sex thus originated in plants and animals for the distinct purpose of securing this mixing of a similar yet different protoplasms of two individuals, and its main result in each case is the institution of a new individual varying from both parents. It is the most prolific source of unlikeness or variation among animals while excess of nutriment is perhaps the most prolific source of variations among plants.

Both Lamarck and Darwin assign as the causes of the two varieties of individuals which we call male and female "the changed conditions of life," or, to be more explicit, the changes which occur in all parts of the environments as outlined above to which the individual has been subjected during its life. It follows that there are as many varieties as there are different sets of conditions and consequently the horticulturist may always produce his own new varieties since, no two localities present the same conditions of life for the plant, and just here it should be emphasized that the personal care of the grower in selecting and determining, so far as in his power lies, the conditions of food and growth by selective feeding, pruning and training has in his hand powerful means of causing variations in any chosen predetermined direction which his fancy or reason may dictate. Intelligent culture will always give good returns.

The changes in the physical surroundings of plants, which man can control are briefly:

(1) Climate.
(2) Food supply.
(3) Changes of seed.
(4) Bud variation.
(5) Struggle for life.

By planting in chosen localities he may control the light, heat, moisture and soil conditions to a much greater degree than is usually supposed. The hillside with its facing to north, east, south, west, presents more variations of climatic conditions than are generally recognized. The hilltop and valley present very different conditions from the hillside. In short he who has observed these matters no longer doubts the climatic influences for variation are to a considerable extent under his control. As regards the food supply the case is much better known and more easily controlled and this control is very generally practiced. The important factor of change of seed is of undoubted and great influence as is evidenced by the existence of the large industry of seed supply. Bud variation on the other hand is not so well known and consequently not so frequently practiced. The fifth condition, that of the struggle for existence, is thoroughly looked after in what we call cultivation. The grower removes all plants that seriously compete with his "*cultivated*" plant because were he to leave them in proximity to his *proteges* he would compel them to compete with the weeds and other plants for their light, moisture, food and all else which is necessary for their well being. It will be seen then that intelligent cultivation of fruits and other culture plants is as yet only partially carried out and that much remains to be done even from the standpoint of commercial plantings. Improvements in cultivation have been mostly made along the line of machines for supplying food and for the elimination of the factors concerned in the struggle for life on the part of the plant, leaving it freer to mature larger quantities of the products for which we cultivate the plant.

The improvement of the plant and its product receives far too little attention from the grower, but such attention will always be well repaid.

Not every variation, however, is an advantageous one, whether derived from bud, cross or seed. And this fact necessitates the constant and intelligent selective activity of the grower who aims at the best final results.

It is highly improbable, if not impossible, that universal varieties, *i. e.*, varieties which will do the best over a wide range of climate, soil and other conditions will ever be produced, and it is apparent from what has been said above that this must be the case. Nevertheless each well marked climatic and soil area may hope to maintain and can originate varieties (if such are not already in existence) which will be assured successes in the hands of the horticulturist. They can be produced by the careful selection of such varieties as are constantly occurring in all plants of every locality.

We often hear it said that such and such a variety has "*run out*" or is no longer valuable.

Running out is not deterioration, it is simply the change, the modification of the plant which is inevitable from the fact that we do not preserve for it a stable environment. Most varieties disappear by changing into several or many new forms, some good or better and others not so good as the original form.

As a rule when we speak of potatoes, tomatoes, strawberries, etc., having "run out" we mean simply that so far as our present crops are concerned they are not up to the standard of size, color, etc., which we have set and wish to maintain, and this condition has resulted not from the deterioration of the originally standard product, but from our failure to keep up the supply of standard plants by careful and intelligent selection. Large size, a character so much sought for, is an abnormal thing to begin with and it requires constant attention to maintain it in those varieties which are not firmly fixed. The lack of attention on the part of the grower is then the main source of running out. He has allowed the inferior varieties to multiply and has not been sufficiently careful to select for propogation those plants, seeds or buds which would either maintain his artificial product or improve it.

While it is true that we may never hope to have a science of plant breeding as exact and definite as that of animal breeding, for causes which we have not the time here to enter into, it is also true that we now know many practical facts about the definite breeding of plants, and are in a fair way to soon discover many other facts of the greatest importance effecting our procedure with plants and insuring greater certainty in results as well. With many forms of plants we can now proceed according to well established principles to get what we want in the direction of new varieties.

To show how little has been done in the way of the creation of new varieties of fruits and how much has been done with some of our garden vegetables I will call your attention to the following interesting cases which form part of the rapidly growing science of plant culture.

Three of our well known small fruits, the dewberry, the blackberry, and the raspberry, have in each case started from wild plants which were selected by men for their especially large and fine fruits and ever since both by selection of seedlings and sucker plants the varieties have been improved in several directions and are still capable of much more improvement.

In 1892 there were eight hundred and seventy-eight varieties of apples on sale in the American markets. All of these were derived from chance seedlings, not one being the direct product of intelligent selection and breeding on the part of man.

The reasons for this are the following: In the first place careful, persistent, scientific breeding of the apple has never yet been anybody's business—nor the business of any institution whose efforts outlive those of individual men, and in the second place without such efforts, few results are to be hoped for from such long period plants—*i. e.* plants which require so many years to pass from generation to generation that the heritable qualities may be observed for intelligent selection. Practically the same is true of the Peach, Pear, Plum, and other large fruits.

In the case of small fruits and vegetables as well as flowers and ornamental plants the story is very different.

Let us take the bean as an example:

The story of the creation of new beans reads like a novel. "Some two or three years ago, a leading eastern seedsman conceived of a new form of bean pod which would at once commend itself to his customers. He was so well convinced of the merits of this prospective variety, that he made a description and "taking" name for it. He then wrote to a noted bean-raiser describing the proposed variety and giving the name. "Can you make it for me?" he asked. "Yes, I will make you the bean," replied the grower. The seedsman then announced in his catalogue that he would soon introduce a new bean, and, in order to hold the name, he published it along with the announcement.

Two years later Prof. Bailey, whose account I am following, visited the bean-grower and asked him, "Did you get the bean?" he answered, "Yes, here it is," and sure enough he had it, and it answered the requirements very well. Another seedsman would like a round-podded stringless, green-podded bean. This same man produced it, and I went into a field of fifteen acres of it, where it was growing for seed and the most fastidious person could not have asked for a closer approach to the ideal which the breeder had set before him some four or five years before."

How is all of this done? It looks simple enough. The ideal is established first of all. The breeder revolves it in his mind, and eliminates all the impracticable and contradictory elements from it. Then he goes carefully and critically through his bean field, selecting particularly those varieties which are most like the desired kind, and marks those plants which most nearly approach his ideal. The seeds of these are carefully saved, and they are planted in isolated positions. If he finds no promising variations among his plantations, then he must start off the variation in some other way. This is usually done by crossing those varieties which are most like the proposed kind. He starts with one plant; the next year he may have only two. If he has ten or twenty good ones, then his task is an easy one, for the variety has elements of permanence—that is, of hereditability in it. But he may have no plants the second year. In that case he begins again, for if the ideal is true, it can be attained. This bean breeder to whom I have referred, and upon whom many of our best seedsmen rely for new varieties, tells me that he has discarded fully three thousand varieties and forms as profitless. This only means that he is a most astute judge of beans, and that he knows when any type is likely to prove to be a poor breeder."

The bean also affords an excellent example of the care which it is generally necessary to exercise to keep any variety true to type. The person of whom I have spoken, in common with all careful seed growers, searches his fields with great pains to discover the "rogues" or those plants which vary perceptably from the type of the given variety. The rogue may be a variation in size or habit of plant, season of maturity, color, or form of pods, productiveness, susceptibility to rust or other aberrance. In fact, any of the variations which we would select were we now trying to create a new plant instead of trying to hold true to an ideal of a variety already obtained in the dwarf or bush beans which are now most exclusively grown. The most frequent "rogue" is a climbing or half-climbing plant. This is a reversion to the ancestral type which was no doubt a climbing plant. This rogue is always destroyed, even though it may be itself a good bean. In some cases, the men who perform the roguing are sent along every row of a whole field on their hands and knees, critically examining every plant. The effect of this continual selection is always to push on the variety to greater excellence."

The element of time can not be eliminated and must be sufficiently allowed for. It is in this manner that the innumerable improved varieties and new varieties of plants are originated by growers, and the methods I have described above are good examples of the most scientific plant breeding. The bean is an annual plant, while all of our large fruits require several or many years to bring to full bearing, and a condition such as could be used for scientific work in apple breeding, for example.

In order to put in concise form the facts we have been considering, I have formulated the following ten rules of Plant Breeding which sum up such of our knowledge as we have yet put in practice. They tell us briefly how to breed new varieties:

1. Selection is the key to it all. This requires that you know how to cause your plants to vary.
2. Breed for one thing at a time.

3. Characters which belong to the plant as a whole are the most important.

4. Slight variations, and especially variations of buds, are more important than others.

5. Do not attempt to get characters foreign to the plant, or which contradict each other.

6. Plants which vary much will give quickest results.

7. Select for crossing only plants which have the desired character well marked, and use crossing only to start the variety.

8. The hereditary power of plants varies much and can only be found out by trial.

9. Have a mental image of what you desire to produce and select to get change toward your ideal.

10. As we begin with selection, so we end with selection to keep up each variety to its high standard, for the best final results are had from intelligent choice and the best cultivation.

RULE 1.—Selection is the key to all plant improvement for with the initial variation to work with, selection determines the result.

To get the initial variation if you do not find it ready at hand in your garden or orchard raise seedlings or propagate bud varieties until you get the satisfactory beginning for your desired product. Vary the conditions of culture until the requisite end is reached.

It is the mind open to see the opportunities, which is usually lacking in this work, for nature offers countless forms to practice the art of selection with.

RULE 2.—Breed for one thing at a time.

Do not attempt to get increase in size, color, flavor, and other desirable qualities all at the same time, for such an attempt is almost certain to fail, while by concentrating your energies and attention with intelligent selection on the most desired quality success for that thing is practically assured.

RULE 3.—Characters which belong to the plant as a whole are the most important.

This is true for the reason that such characters as belong to all parts of the plant alike are more certain of transmission to the offspring. Seeds saved from a large apple or peach such as may be borne on one or more limbs of a tree are far less likely to produce trees which will bear large fruits than seeds saved from fruits of trees that bear uniformly large fruits; but under no circumstances sow small or poorly developed seeds though they may come out of large or otherwise desirable fruits. Since the seed contains a new plant body whose parts are already well developed such a procedure would amount to propagating a poor or weakly plant. The benefits following the use ot good, well developed seed are a more uniform crop, increase in vitality of the plants, and consequently earlier maturing of fruit or other crop and usually larger quantity of crop.

RULE 4.—Slight variations and especially variations of buds are more important than others.

This is true solely because large variations are as a rule inconstant and can not be depended upon to transmit themselves, which is another way of stating the law that "The tendency to resemble its parents is generally the strongest tendency in any plant." So that in the case of parennial plants bud variations are the most valuable material to serve as the starting point in the creation of new sorts, these variaties come true from seed often times and consequently selection of seeds can be practiced here as elsewhere.

RULE 5.—Do not attempt to get characters foreign to the plant, or characters which contradict each other.

To illustrate, since each natural group of plants have developed characters and a mode of growth during the course of their evolution it would be in general unwise to attempt to create new characters in the members of the group since this could only be obtained at great expense of time and energy. The surest and quickest results will be obtained by working with the variable characters of the plant along the line of its inherited tendencies of growth and development. From the great plant family Solanaceae we cultivate the Tomato, Potato, Red pepper, Egg plant, etc. Now the first mentioned produces fruits but no tubers while the second produces both. Obviously it would be a waste of energy to attempt to get a tuber bearing tomato, though it might be done. But since in that case the fruit crop of tomatoes would be reduced or entirely disappear owing to the fact that the plant can not develop two antagonistic crops, what was gained in one direction would be lost in another.

On the other hand since the potato now produces tubers in great perfection and fruits indifferently, it is well to continue the improvement of the tuber and neglect the fruit crop of this plant. Neither can we expect to get both large clusters and large fruits in the cluster both at the same time since these two conditions antagonize one another. And we find that with the increase in the size of the tomato fruit the number borne in cluster has decreased, so also the potato tuber. The same is true of the apple while in the grape on the other hand we have tried to get large cluster and neglected the size of the individual fruit.

RULE 6.—Plants which naturally vary much will give the quickest results.

Almost all of our widely cultivated species are very variable, as the peach, plum, apple, lemon, orange, rose, banana, gourd and melon family, beans, potato, tomato, grape, barley, wheat, rice, cotton, corn, etc.

This is a very important fact and as fortunate as it is important, for it enables us to push on our variation experiments with the best hope of ultimately succeeding in producing varieties which will insure the continuation and advancement of our civilization. Few persons realize how absolutely modern civilization depends upon the wheat crop and the further fact that the time is rapidly approaching when the great wheat-bread eating nations must face starvation or a change of food unless we can create new varieties of wheat which will produce two loaves where one is now produced. Bread is the staff of life of all the great civilized nations of this day and a substitute for wheat is nowhere in sight. The present generation has the tremendous responsibility of securing the continuation of human civilization and its continued advancement by the settlement of the question of wheat supply. Increases of acreage will not suffice for possible new ground for wheat culture is already reduced to a very small element and population and consequent consumption is increasing much more rapidly than wheat production. Fruits, vegetables and other grains than wheat can not be made to supply the lack of wheat so far as we can at present see and so we are left face to face with the problem of creating more prolific varieties of wheat. Will scientific men be equal to the occasion? We can only answer that science has not yet failed in such a case and all of our past experience, small as it undoubtedly is, gives us the hope of ultimate success.

RULE 7.—Select for crossing only plants which have the desired characters well marked, and use the method of crossing only to start the series.

This general rule should be closely adhered to for the reason that crosses, showing variations of pronounced kind are less stable than bud variations.

RULE 8. The hereditary power of plants varies much and can only be found out by trial.

It has long been known that "Cross Breeding greatly increases the chance of wide variation, but it makes the task of fixation more difficult."

RULE 9. Have a mental image of what you desire to create and select to get change toward your ideal.

This is necessary in order to create and maintain a standard of excellence. The standard chosen should never be as low as the best now existing, for in that case no improvement would result. The plant should be thoroughly studied in all its aspects in order that the worker may be an expert judge of its qualities, and with this preparation well directed, persistent and uniform effort through a number of years, or it may be a lifetime, will be necessary to gain the prize sought. If this seems a long time and too great a price to pay for a new variety, we should remember that in the past we have progressed much more slowly than we may in the present and in the future.

RULE 10. As you began with selection so you end with selection, to keep up the variety to its high standard, for the best final results are to be had from intelligent choice coupled with the best cultivation in the fullest sense of the word.

Men may come and men may go, but we may rest assured that this Society will go on for a long time, and, ladies and gentlemen, it behooves you to so organize your forces, that your efforts of to-day—at least some of them—shall be so directed that in the future when we are all gone from this scene, your children or your children's children will say, "Our forefathers were indeed wise and humanitarian in that they spent their money and their thoughts to give us the precious legacy of new and greatly improved fruits, and other culture plants." In working out its plans for progress this Society should devise means whereby sets of experiments on the apple and the peach at least, are to be begun under auspices such that when the men, who start the work, cease to think and lay down their instruments, those who take them up to continue the work will find full and complete records and the well conserved results previously attained, waiting for them to use in pushing on the work to its final solution. I conceive this to be the highest function of such an organization as yours and the world is waiting now for just such enterprise to be expended on its culture plants of all kinds.

We have many agencies, such as experiment stations and private individuals, working in this same general direction, but the field is so large and the time required for results so long that the efforts of this society would form a great and needed addition to the work. Its main strength would lie in the singleness of purpose attained by the selection of one fruit upon which all its efforts could be expended, and the fact that the Society life need be but little affected by the passing lives of its members, and thus the work could go on generation after generation uninterruptedly to a final success not to be hoped for from any other plan.

In closing let me assure you that the time will never come when the work of the creative horticulturist will not be needed—for this reason—that even good varieties change and thus necessitate the constant endeavors of mankind to maintain and improve his possessions.

HOWARD AYERS,
University of Missouri, Columbia, Mo.

The programme for the evening closed with a beautiful bass solo.

SECOND SESSION.

Wednesday Morning. Held in the Court House.

Called to order by President Murray.

Prayer by the Rev. J. B. Brewington.

The subjects taken up during this session were the Raspberry, Blackberry, Dewberry and Grape. The papers were read and discussion followed.

The President appointed the committees.

On Fruits.—F. HOLSINGER, Rosedale, Kansas, H. S. WAYMAN, Alvord, Missouri, C. H. DUTCHER, Warrensburg.

On Flowers.—M. W. SEARLE, Lebanon, MRS .A. Z. MOORE, Cedar Gap, MRS. ORR, West Plains.

On Finance.—J. C. EVANS, Harlem, JOHN SNODGRASS, West Plains, J. M. SPEER, Butler.

On Obituary.—W. A. GARDENER, West Plains, J. M. STEDMAN, Columbia, W. H. LOOMIS, Mt. Grove.

On Final Resolutions.—J. C. WHITTEN, Columbia, W. W. HENRY, Butler, P. P. DOBOZY, West Plains.

PLANTING AND CULTIVATING THE RASPBERRY.

Mr. President and members of the State Horticultural Society: It was assigned to me to give a paper on planting and cultivating the Raspberry. Now I will say this in advance, I am a better hand with the hoe and plow and to cultivate fruits and to prune trees, etc., than with the pen, but, however I thought while I have many years of experience growing the Raspberry, especially the Blackcap variety, I give my consent to give a paper on the subject. I will give some of the most necessary points, and then leave it to the grower to work out his own salvation.

Now first, and above all things, the grower must be a person of good judgment and good common sense, and have a love for the business. Without this qualification I will not guarantee him or her success.

Second, You should have good dry land, porous enough not to hold water, and yet at the same time not subject to drouth, and rich enough to produce from sixty to fifty bushels of corn per acre. Plow and prepare your ground the same as you would for the corn planter, that done, have your plants ready. Use strong tip plants, then take a two horse plow and mark off rows seven feet apart. Make furrows about five inches deep, plant in the bottom of the furrow and cover the plants with mellow earth about two inches, plant four feet apart in rows. After the plants have made a growth of about six inches or more fill up the furrow with the cultivator and hoe. This deep planting is necessary, first, in order to let the plants withstand the high winds better, which are often very hard on them, blowing the new ground loose from the roots; second, in case of a dry spring the plants are not apt to suffer as when planted shallow. Now cultivate and keep clean and the ground level. A crop of melons may be grown between and in the same row with the raspberries the first season but after that no other crop should be grown with them, unless it should be fruits, peaches excepted. Planting raspberries in a young orchard works fine until the orchard bears, then the briars are much in the way and should come out. Plant as early in the spring as the ground will do to work. Don't plant in the fall of the year.

Next spring cut back before leafing out, to about twelve to sixteen inches of the main stalk and if the first years growth was good, it may pay you, if you have the straw, to mulch them lightly, to keep the berries clean. After the first year, when the new growth is about two feet or less, pinch in the bud to keep from growing too high and they will branch off, but do not interfere with the growth of the branches; let them grow all they want to, it will weaken the plant if you do, till the following spring, then cut back in about two feet of main stalk, cultivate and keep clean as the year before till about the 15th of July, then cultivation may cease if the land is not too foul, and let the grass grow, it will benefit the land, but rank weeds should be cut down.

Now I have given you the main points how to plant and cultivate the Blackcap raspberry and will leave the rest to the grower's best judgment, but however I will say a word or two in regard to variety. Plant the Doolittle for early and the Hopkins for main crop; still there may be other varieties better, which I do not know of. Don't plant late varieties for the market, they will come in competition with the blackberries and the hot weather is against them.

Now a few words for the red raspberries: Have good land as for the Blackcap, plant four and one half feet apart each way and cultivate both ways like corn in hill. Turner is a reliable variety to plant.

J. H. MONSEES, Beaman, Mo.

DISCUSSION ON RASPBERRIES.

Major Holsinger (Kansas).—The Kansas is the best berry. It is larger than others and better. The Doolittle I can not grow. Hopkins is passing out and in its stead we are planting the Kansas and Gregg. Also Thwack and Custer for red, instead of Turner.

N. F. Murray.—That is very good advice.

T. W. Wade (Green Co.).—I like the paper just read. The Hopkins is the most successful with us and for red I plant nothing but Turner. My method is different, however. I let the bushes form a hedge row and keep the middle clean. I do all the cutting back in the spring. We plant six feet each way. We have not tried the Kansas in Green county.

Mr. Searle (Laclede Co.).—Letting weeds and grass grow for the ground and cow peas between the rows, worked well with me. Cuthbert I find subject to winter kill.

A. Nelson (Laclede Co.).—I have tried other varieties of red raspberries, planted six feet by four in matted rows. I plow the center but find the suckers hard to keep down. The Hopkins did well until disease came (Athracase, perhaps,) and the hail blotted it out, when I started on a new patch.

When the blackberries did not sell at five cents I evaporated them, as I could make more if I got twenty cents per pound. Now the price on market in St. Louis is only fourteen. The best profit is in shipping pint boxes. For Turner I want the bottom of the box near the top, and I want to get them to the consumers soon.

In rainy weather it takes more berries to the pound of evaporated than in warm, bright seasons. It takes three to four quarts to make a pound of the dried fruit.

J. C. Evans.—What time do you sow cow peas?

Mr. Searle.—Sow them broadcast after picking.

A. Nelson.—One of the cow peas family that has humbugged the people is German coffee berry. Cow peas are from one to two feet high with fifteen to one hundred and twenty-five peas on a stalk.

The Soya bean is to be the thing. It is a wonderful yielder. The leaves fall to the ground and make humus for the soil. There is no better green food for berries. It is much the best to turn it over.

Evans.—It depends on the land whether this spreads so. On rich land it vines and reaches two feet above the corn.

Nelson.—There was an old road through my garden in which I planted cow peas. The growth was wonderful. The vines were eight feet across. One crop of peas and one of sunflower were turned under and they brought the road to a fine state. We should give the sunflower more attention and turn the stalk down for humus.

Scientific men say our land is not worn out but needs properties restoring and loosening the plant food already native in the soil.

Murray.—The cow pea is an after crop. What shall we use to keep the berry from getting soiled?

Evans.—Get a variety that will stand up. You can not raise good berries and keep them on the dirt.

Murray.—I endorse the statement that the Kansas is the best main crop. The Babbitt is one third stronger in bush and bears a heavier crop. It ripens with Hopkins. I pick it to ship to different market. It does not carry well when picked with the dew on, so I picked it when wilted, put it in the cooling house and it went through in good condition. Pick the patch in the morning for near points and in the afternoon the less ripe fruit for long shipments.

There are more failures from the poor condition of picking than in growing.

Now about the price of evaporated berries. In Omaha, those from California brought thirteen cents by the car load. In New York the blackberry brought twelve cents.

Holsinger.—Some years ago I evaporated six cases and they produced four and a half pounds to the crate. I must have thirty cents per pound if I can sell the fresh berries at $1.50 per crate.

D. A. Robnett (Boone Co).—Can you stake the black raspberry with success?

Ans.—Not much practiced.

H. S. Wayman (Mercer Co.).—What success is there with the Nemaha? The Kansas seems to have better prospects. Nemaha is not so full but the plant is good.

Evans.—I had the Nemaha for two or three years, but it was not a success. What of London Red?

S. Kaufman (Oregon Co.).—It commenced bearing the first year and will bear in succession quite a while. It is a little weak now but will be fully ripe in three weeks. This is the third year.

Goodman.—In South Missouri we have had this for two years. The Kansas is a good producer and the bush is better than the Hopkins. We have planted some Gregg, also. Two plantings failed but now it promises well. The Cumberland is a good new variety. Miller's Early is earlier than the Loudon or Doolittle and is more productive.

The distance for planting is eight feet by four; by fall the branches grow together. Doolittle can be six or seven but not the Kansas; it should be nine feet.

There is a new berry, the Evans. I saw the berries at their best and they will be on the market some day. On rows alternate with Hopkins we picked two and three boxes to one of Hopkins, and yet the Hopkins seemed full.

C. H. Dutcher (Johnson Co.).—The winter did not let the branches root. Is this an advantage!

Goodman.—It is well to pinch only once. The rooting helps to carry them safely through the winter; so let the side branches go and root and then cut them off.

E. Moyer (Wright Co.)—Should we pinch the bud and let the lateral go, or not pinch the laterals?

Goodman.—Let the lateral grow.

Holsinger.—It costs not less than ten dollars an acre for plants.

Murray.—I agree with the secretary in advocating wide planting.

Evans.—I have the best raspberry on earth for Missouri, at least, for my Kansas City place. It will stand up and keep the berries off of the ground. It does well at Olden, also.

Murray.—My Evans plant I can indorse in both size and productiveness.

Barnes.—Griesa, the originator of the Kansas, has a new red berry, the Cardinal. It is the largest I ever saw, rugged and hardy.

It has red qualities and does not tip nor sprout as much as the Turner.

Holsinger.—I like the Schaeffer but it is not a good seller, because it is too soft to market, but it is fine for home purposes.

Member.—I have raised Schaeffer but the Columbian carries better.

W. W. Cone (Oregon Co.)—Why is it better for the plants to root?

Goodman.—It helps to maintain the vitality in winter during the freezing and thawing and helps to draw in moisture; therefore, it is better to let them root.

Cone.—In poor land is not six by three feet better?

Goodman.—Try cow peas on the land and then plant eight feet.

PLANTING AND CARE OF THE BLACKBERRY.

The blackberry, being made up chiefly of water, requires a moist soil. A clay loam, containing plenty of humus, is probably the best soil to grow them to perfection. The land should be plowed deep and well pulverized and free from clods before setting the plants out. The best success we ever had was by turning under a crop of cheat when about a foot high, and then planting.

Plants from root cuttings are to be preferred. These we dig in the fall and cut into pieces three or four inches long, and bury in the ground till spring, mixing the soil among the cuttings. These may be planted in the spring in a nursery row and left for a year before setting out in the field, or may be planted where we wish the plantation to remain. We prefer the latter. Many use the suckers that spring up about the bush and these are very satisfactory.

The plants may be set in the fall, but most prefer the spring for setting all small fruit plants. If from suckers, they are set in a furrow five or six inches deep. But if cuttings are used, three inches is deep enough. The rows should be eight feet apart, and plants three or four feet apart in the row. If the plantation is a large one it is well to skip a row at intervals, that one may have a roadway for convenience in hauling off the old canes.

The first year, potatoes, peas or beans may be raised between the rows. We have raised Cow peas between and in the rows, and think, with benefit to the plants. Three or four canes are allowed to grow the first year, and these are pinched off when two or three feet high. One must go through the patch four or five times during the season as the canes reach this height.

The laterals that start out after this pinching are allowed to grow till the following winter or spring, when they may be shortened. These may be left from twelve to eighteen inches long, according to the vigor of the plant.

From these laterals is obtained most of the fruit. Should any rust appear on any of the bushes these should be dug up at once and burnt. This should be done as soon as it appears, which can be told by the peculiar appearance of the leaves on the new shoots. If left too long, the rust may spread to other plants.

The canes that have borne fruit should be removed during the following winter or spring and burnt. These are cut off close to the ground with long-handled shears or a cutting hook. After the canes are well established the cultivation should be shallow and frequent. A spring-tooth cultivator is a good tool, or the Planet Junior twelve-tooth cultivator.

If the ground is gone over once a week the plants will stand the drought much better. This cultivation should begin early in the spring and as soon after a rain as the soil will admit. This cultivation is very important, as the blackberry is mostly water and requires a moist soil.

After the crop is harvested one good cultivation is enough and nothing more need be done unless one wishes to remove the old canes or some new growth may need nipping.

S. HYDE, Carthage, Mo.

DISCUSSION ON BLACKBERRIES.

Evans.—I heartily endorse every word of this paper, and will add that in pruning the blackberry it depends on the variety. With Snyder, cut off the laterals short, to about six inches in February. The Taylor should be cut longer. Employ little people to pick. Cut the stalks about two feet.

Dutcher.—When is best time to pinch?

Evans.—When the bushes are high enough. Early Harvest is left longer than Snyder.

Murray.—Go over the bushes several times to get at the same height.

Evans.—Do your pinching when it is the right time, and do not wait until the branches grow too long. This is also the way with raspberries.

Holsinger.—I allow the plants to grow until before picking, and then cut off the branch below the foliage so that the fruit shall not be covered. Nature gets rid of the dead canes so there is no need of work.

I have had rust on my plants for fifteen years, but have a good patch. The Taylor does not have it—Snyder can stand it. I do not have time to hunt it out; it costs too much. This is nature's way of destroying berries.

Dutcher.—Does the rust spread from plant to plant?

Holsinger.—No, you can not innoculate with it. If it does spread the patch can stand it.

Prof. J. C. Whitten. You can not innoculate fresh leaves with the rust, as it spreads below ground. The red spores fall to the earth and are washed into the roots, and so grow up into the plant. The germination will take place on any blackberry root if conditions are favorable.

Where Early Harvest are between apple trees, the rust will soon kill them out. The best plan is to take out all parts of the plant which have a yellow appearance and before this turns red, and so get rid of the rust before it has matured. There will be but few affected plants where this appearance has been cut out, where it was not, the plants wilted down and another year did well, but not so well as where the cutting was done.

Tippin.—Is there any relation between blackberry rust and wheat rust?

Whitten.—There is the same relation as between a soft and a sugar maple, but they are not the same. Wheat rust propagates similarly to that of blackberry. The brown spot on the stem or below ground is not different on a different intermediate form. Rust on wheat has an intermediate form on the barberry. The rusts on blackberry and raspberry are not alike.

Holsinger.—I like my fields uniform and convenient for picking. If the terminal is taken out you have varied heights, the other way the bushes are uniform and the fruit is easily visible.

George Comley (Howell Co.)—Is there anything to destroy this rust?

Whitten.—There is nothing to put in the soil as fungicides, for when in the earth they lose their strength. Bordeaux mixture is too expensive. It is best to cut it out. Young sprouts four inches long will show the yellow thickening, and this is the time to eradicate it. Ashes invigorate the plant and help it to resist disease, but have no direct effect on the plant.

The rust is found on the native wild plant, and spores are easily carried to the cultivated ones The disease was undoubtedly brought in at the time of selection for cultivation. One member says it spreads more rapidly on clay than on sandy soils, but we can not tell.

Tippin.—Snyder is the best, most profitable and least subject to rust. Early Harvest is next. Kittatiny I have abandoned. Agawam is fair. The two best in Greene county are Early Harvest and Snyder.

There is a good deal of theory on rust, but we have the laws of nature to contend with. The conditions which will produce it in wheat will in blackberries also. We may have it once and then not again for two or three years. Atmospheric seasons effect the rust. During a warm, sultry, rainy spring wheat and oats were both destroyed on the same soil.

The Snyder is least subject to rust. Of the Erie I do not hear favorable reports.

Goodman.—We have discarded all but Snyder and Taylor's Prolific. They are free from rust in injurious quantities. Prune Snyder close and it will give a good sized berry. There is no better grower than Taylors; we pick it for six weeks; the last as good as the first, unless it has been too dry. We planted Early Harvest to mark off the others and had, in consequence, to destroy the whole plantation.

Wayman.—The Snyder is also hardy.

Murray.—The Taylor is equally so.

Tippin.—The Taylor is reported as exempt from rust as any.

Wade.—Same as Tippin, I mixed Kittatiny and Snyder; the Kittatiny rusted out, but Snyder stands. Early Harvest rusts some. Did not dig them out either. Early Harvest gives a good crop.

Holsinger.—The Taylor is late and claws are mean for pickers.

Murray.—Experience varies. The Taylor is the best late blackberry, but not exempt from rust as I find.

T. W. Wade—(Greene Co.).—My opinion is that blackberries must be canned in these parts; there is too great a quantity here, so it does not pay to evaporate them.

There is success in canning and a profit—in strawberries at 75 cents a crate, raspberries at $1.00, blackberries at 60 cents. It is no trouble and it is profitable. Out of crate you can make twenty-four two-pound cans.

Snodgrass.—The best varieties I find are Early Harvest, Snyder and Taylor. The first I can ship to advantage at from $1.00 to $1.50 per crate. Others not profitable.

Goodman.—In western New York a hundred acres were planted for evaporation. Fifty cents a case makes more than off grapes. A dollar a case with boxes returned is more than $1.25 and boxes not returned. They bring in the berries three times a day and can and evaporate immediately after picking. The difference is five pounds, *i. e.* two quart cans when crate is left over night. When grown in large quantities and canned there is a benefit in relieving the market. To sell at 75 cents to a canner is better than to risk the chances on shipping.

Holsinger.—I sold them at 40 cents per case, and that is eight cents margin on each case. Last year was not so good for selling.

Cone.—In western New York they use a case holding from sixteen to thirty-two quarts, dry measure.

Snodgrass.—For the work we use an ordinary evaporator with special trays.

Murray.—Blackberries sold at four cents per quart, dry measure, for all that the merchants could get.

How many pounds are there in a case?

Goodman.—Three quarts make a pound. Blackberries bring fifty cents a case, or two cents a quart. For the evaporated fruit one can get from eleven to twelve cents per pound. Pick when the berries are ripe and you get twice as many a day. Machines gather much quicker—pay a half cent a box for picking.

Murray.—In north Missouri we got 75 cents a case for blackberries to can in Arkansas. The second year they took by weight and we made more money. At two cents a quart an acre nets $80.

Kaufman.—When should blackberries be planted?

Answer.—Spring is the time, all the time, for all berries.

DEWBERRIES.

Murray.—My experience is one dollar a plant and no success.

Wade.—I planted a few rows—the berries were not so numerous, but longer and soft, full of thorns, on the ground so hard to pick, and in the way of blackberries.

F. H. Speakman—(Newton Co.)—Dewberries are interesting and a success with us. Mr. Wild of Sarcoxie has had seven years experience with them, and is enthusiastic over the Lucretia.

I set out 1,000 plants two years ago. They produced fruit in one year. About four hundred died. In one year I had seventy crates and they sold better than Early Harvest, at two dollars a crate in Denver. The soft berries will injure the others, but they carry well to Omaha.

The propagation is from tips and they are best trained on the ground. The land for them is like bottom land, good, rich loamy soil, with some loose stones and gravel. These netted $1.25 per crate; there is no serious disease in them, and severe cutting relieves the rust.

PROFITABLE GRAPES.

The task assigned me is greater than I am able to do justice, therefore, I kindly ask for a little forbearance, and if only a few members of our society should gain profit from my personal experience expressed herein, my effort will be tenfold rewarded. Well knowing one man's owl is another man's nightingale, and vice versa, so the same grape may be a bonanza for one fruit grower and a total failure with another as the final result of a combination of conditions often uncontrollable. It is more or less a difficult problem to be solved by every fruit grower for himself, which varieties, if properly cared for, adapted to his soil, and sold fresh from the vineyard or made into wine, will give the best cash reward in near-by or distant markets.

One thing I know surely: All grapes shipped to a distant market, no matter how poor and miserable they may be, are a source of great profit to the railroad company and the commission man, and only the skimmed blue milk is left for the fruit grower, provided it is not spilled entirely by some pig.

Last year the commission firm, Meacham & Brundage, St. Louis, Mo., shipped 450 nine-pound baskets of the finest Hicks grape for me to Milwaukee, Wis. They realized twelve cents per basket in Milwaukee, but gave me only $15 for the entire lot, equal to me net only three cents per basket, or one-third cent for each pound of the finest black grape. So fully three-fourths of the money received by them was absorbed by the railroad company and the commission man. One of my friends received not one cent for 100 baskets of Concord grapes shipped by the same firm. The same rule applies to the Ohio and New York grape growers. Their grapes were sold last year in St. Louis at retail at 10 cents per basket; deducting freight, commission and retailer's profit, I ask: Did the fruit grower receive one-half cent net for each pound of fine grapes, or even less? By the way I agree with Mr. Bomberger: "There is no earthly excuse for us in Missouri buying our grapes from Ohio or New York," and I add, not even from California.

Now, what varieties are specially profitable? Last year even the poor Hartford was profitable to me, each plant had twenty to twenty-five pounds of grapes and netted from thirty to thirty-five cents from every twenty pound basket. My neighbor sold his poor Champion for three to four cents per pound before my Moore's Early could be had. Moore's Early is profitable on account of its quality as well as earliness, even if a poor grower, producing only moderate crops. The Worden will be found profitable for the same reason, though it produces more fruit. Norton, Cynthiana, Missouri Riesling and a few others will be profitable for wine, considering their quality. The finest table grapes for many years to come will be the least profitable to producers, until we are able to educate the masses in the large cities to make the proper distinction between fruit and fruit in regard to appearance and quality. It has been amusing to me to speak about grapes with fairly and well educated people in the city and finding that most of them know the Concord by name, any black grape being the Concord to them. Further, they know that there is a white grape and a red grape, making a total of three varieties of grapes. (My friends, I am not joking or even ridiculing the people.) These are generally the folks buying a fourth species of grapes, the Californian, which has all colors, is large and showy, costs more than our Missouri grapes, and sometimes taste nearly as well, but curtails the profits of the Missouri grape grower.

It is useless to say that the Concord is or has been a profitable grape, also some seedlings of it, like Worden Eaton, Pocklington, etc.; in fact, a black grape is more profitable as a market grape than a white or red variety, though Missouri Riesling, Elvira and Niagara have been profitable to me. Rogers No. 1 and Goethe have given me the highest price in St. Louis markets, nearly double the price of the Concord, while the quantity per plant was about equal. My new St. Louis grape has brought fair returns—a seedling of the Concord, tested twenty years, is less foxy, has better color, dark black, more vigorous and productive, bunches more compact, making an excellent wine, standing in quality half way between Concord and Virginia Seedling.

When I finally consider my new Hicks grape, a seedling of decided foreign and native origin combined, as the best and most profitable grape of the day for me after ten years of severe trial and testing, I seem to be too egotistic, but it is one of the great trio: Campbell, McPike and Hicks. Time and trials will verify my statement, that I consider it to be the great, new Concord of the twentieth century, which place the Hicks will conquer on its own merits alone. In health and growth it is outgrowing the best, in productiveness it excels the most productive, (in 1897 one vine three years old, second crop, had about one hundred bunches, weighing a little over thirty-two pounds), in quality equal or superior to the finest of our native black grapes, a wonderful combination of a profitable table, market and wine grape. The quality of the wine has the nearest approach to the finest German or French red wine, more than any other wine I ever tasted.

Now, as I do not expect you to believe such a high statement about the Hicks grape, I will be more liberal than the introducer of new fruits in general, so to convince all doubting Thomases of the truth of my claims for the Hicks grape, I will give free to every member of the State Horticultural Society of Missouri one Hicks grape vine as a present for fair trial and honest report, under condition not to propagate for selling plants therefrom, and sending to me correct address with ten cents in stamps or silver to pay for postage and the trouble of packing, which offer holds good only until December 1, 1899. New York has the profitable Campbell grape, Iowa and Illinois the beautiful McPike grape. That old, grand Missouri may own and profit by the grand Hicks grape, is the sincerest wish of the propagator and sole proprietor.

HENRY WALLIS, Wellston, Mo.

REPORT FROM THE EXPERIMENT STATION.

Prof. Whitten.—We have fruited one hundred and thirty varieties at the Experiment Station, keeping record of time of blossoming, and ripening, and characters, though we can not judge of commercial qualifications as we do not have them to sell. But we are much pleased with some fine table grapes. They sell better when they are better known. In cases where parties were given samples of other varieties than those asked for, to get a taste, they now buy these at good prices.

The Goethe is the finest table grape. Brighton cracks some but the flavor is fine. Lindley, Salem, Massasoit and Requa are good. The Barry is the best dark variety for the table. People do not want Concord when they have tasted better ones.

DISCUSSION ON GRAPES.

Snodgrass.—The best market grape is Moore's Early. Best table is Goethe. Concord and Worden bring but little and are not satisfactory. It will be well to graft Worden to Moore's Early. One variety, Herbemont, which rots badly, I shall pull up and plant Moore's Early, Norton and Virginia. My method is crown or root graft. I left two canes on the stakes and cut one off to the root, then graft to Moore's Early. This does not throw too much sap into the graft and three fourths have grown.

W. A. Gardner (Howell Co.).—It is necessary to get the wood in exact contact; the cambium layer of one with that of the other piece. This is essential in all grafting.

Cone.—Has Munson system been tried? That is an arm like a telegraph pole. Have arm five feet high and then four wires. Train the vines on in alternation; one way for growing and one for bearing.

Snodgrass.—We cultivate with the horse both ways on account of rocks.

Whitten.—We have sprayed grapes for six or seven years. There is one disease in Missouri, the Black Rot. Some fine table varieties are susceptible, but it can be controlled by using Bordeaux Mixture before buds swell, and before the blossom, and twice after the fruit is set, and again after a rain. Herbemont has defied our efforts to save it from the rot, but others are all right.

W. H. Skinner (Harrison Co.).—Varieties differ in their foliage and so we must vary the strength of the formula. Herbemont is tender.

SUCCESSFUL CO-OPERATION.

Mr. President, Ladies and Gentlemen:—Having been assigned a place on the program for a paper on co-operation and distribution, we have herewith briefly outlined the progress made along these lines up to the present. As we are not through with our shipping, and only few returns in up to date, we will not be able to give you a full report of the benefits of the work undertaken. The principle of co-operation for mutual benefit has proved itself worthy of confidence, as evidenced by the successful organization of local organizations all over the country. From New York to California can be found hundreds of localities where individuals have united together as growers of fruits and vegetables and producers of other products, that they might better enjoy the fruits of their toil. With none has the organization of local societies proved more beneficial than the strawberry grower. In the different sections of the country where more than a supply for home consumption is raised, by putting their surplus together they are enabled to make car load shipments to markets not supplied. By this local co-operation their local markets are not only protected, but people in other localities where strawberries and other fruits are not grown, are enabled to enjoy this, the queen of fruits, and pay remunerative prices therefor.

But, Mr. President, if you will permit a little digression here, and for fear I should forget it, I would like to refer to a certain character of fruit grower that we have in some places, not everywhere I hope, but there are a few, now and then one. He is the fellow that will not join in with the local society but stays out, with the view of enjoying a good local market when his neighbors all ship away, and is mean enough to brag about it after he has realized his expectations, being so supremely selfish as not to appreciate the fact that but for the desire of the mutual benefits of others, they would all have had to sell at home, in which case he would not have made a cent.

Realizing that this paper must reach considerable length before we are through discussing the many features that enter into this subject, we pass from this point by stating that as great benefits are derived from co-operation in the local association, so are they, by extending it to the union of the different associations in one section of the country together for the marketing and distribution of their fruits, and the full fruition of our labor will never be fully enjoyed until all sections of the country which grow strawberries especially, are brought into touch with each other. The Southwest Fruit Growers' Co-operative Union was organized at Monett, Mo., December, 1897, for the purpose of distributing the strawberry crop. Owing to the short crop, some of the associations that are members of the Union were not able to ship car loads, and the fact that some associations did not join with us this season, we have not been able to demonstrate as fully the benefits of co-operation in the matter of distribution as could have been done under more favorable conditions. We are glad to say, however, that none of the members are disappointed so far, and are more enthusiastic than ever, and we feel that from the assurances we have that all the associations will join the Union next year. Truly it has been said, "In union there is strength." By a united effort we are enabled to secure concessions in many ways. At the request of our committee we were granted a reduction of $5 per car on refrigeration before the shipping season commenced. Later we were granted a further cut of $5 per car, making a liberal reduction of $10 per car for the season, which is quite a saving to the growers when the number of cars shipped is taken into consideration. We have been able to keep all our cars out of glutted markets as far as the shipments from Missouri and Arkansas are concerned. In a few instances we have had a car in the market where there were too many berries, but in these cases, the unexpected supply was consigned from Illinois and Michigan and other points that we were not in touch with, nor could we get in possession of the information in time to avoid it. This fact goes to show that the association in each strawberry growing district should form a union and then the different unions create a central office or bureau of information, through which a knowledge of the supply could be obtained and the distribution could be made according to markets and demand, whereby each section could always be left to supply the markets nearest to them. This would save thousands of dollars that are paid out in making long hauls across the country, crossing and recrossing each other, seeking markets blindly. The whole matter can be reduced to a business proposition, the same as any other great distributing system—we hope to see the time, and that in the very near future, when all associations will be able to overcome any jealousies that may exist, fully realizing that we have a common cause—the control and management of which should rest solely upon a business principle and not a matter of sympathy or favoritism.

On June 1st six cars were routed for Des Moines, Iowa, out of a total output of sixteen cars from Missouri and Arkansas. Two of these cars were from the Union and of course were diverted. The other four, over which we had no control, went in, three of them to one house—results will be known later. On another day three cars got into Lincoln, Neb., but they were all outside the Union. Had they been under our control, only two in the first case and one in the second would have been allowed to go. While we could not ask associations not belonging to the Union to divert their cars, we escaped the deluge ourselves by staying out and not suffering the misfortunes of a glut, no doubt saving more than enough in these two instances to pay the expenses of the office this season. We could give you others, but this will suffice to give an idea of the work. We wish to say, however, in this connection, that our representatives in the markets have been of great value to us in keeping out of poor markets. By relying upon their judgment we have not used markets that we might have used had we depended on outside information and which would have proved very unsatisfactory. No doubt, but that in two or three instances this feature alone saved a loss of $150 to $200 per car. We mention this fact because this is one of the most valuable features of our work and is entitled to due consideration, and only by co-operation are we able to have this valuable service.

Successful co-operation depends largely upon an intelligent, united action. We cannot urge too much the necessity of the individual grower informing himself as to the way his own products should be handled, distributed and sold. He is the one that must suffer all the losses, and is seldom permitted to enjoy any profits when he yields his influence ignorantly to wily schemes of parties seeking his business. He should study well all the conditions under which his products are sold. He should seek to know if the parties to whom he has entrusted the disposition of his own property are conducting the sale of it in his own interest, or in the interest of the other fellow entirely. Having a knowledge of all these things we will be less liable to become the prey of the unscrupulous solicitor and the victim of a "stuffed" wire market report. The very foundations of our local associations and our co-operative unions will be made stronger; a greater degree of confidence would be established in each other, and in the reliable commission firms throughout the country, that may be found to handle our business. So long as we shall have to consign our products we should demand the right to dictate the way they should be sold. To do this intelligently we must have some knowledge of the way sales are conducted.

In the interest of successful co-operation and distribution, Mr. President, we have presumed that an actual illustration upon the point would be advisable, rather than a supposition, and would be permissible upon your part. If we should say suppose so and so was the case, our enemies would say that is only a supposition. If we use realities the guilty must meet the allegation, stand their trial before a wronged community and be adjudged according to the evidence at hand. In a paper contributed to *The Southwest* by myself last winter, and also published in the last Missouri State Horticultural Report, we referred to some of the abuses of marketing our fruit which were calculated to destroy the benefits of successful co-operation and distribution more than anything else. These we have found to be true in one or two instances.

On May 3, 1898, A put out his circular to the trade, the people to whom the berries are sold, which read as follows: We quote you for tomorrow, Wednesday's shipments at $3.75 per case, Thursday's shipments at $3.50 per case, Friday and Saturday's shipments at $3.25 per case. If market is any lower will give you the benefit. The houses of B, C, D, and E, who use the same territory, had to meet the price fixed on berries before they were picked five days ahead. A also, in order to keep competitive markets used as distributing points from making a better return sale than he could, re-consigns and sells berries there at 25 to 50 cents per case below the prevailing market price. B, C, D and E, who are trying to protect their own market, also to hold up the price, endeavoring to carry out the wishes of the grower, make a complaint. A's men, who are selling berries in the territory, make great capital out of this complaint, telling the consumers that it is because A's house is cutting the price. Also boasting of the fact that their house, Mr. A., always leads in cutting prices, impressing upon the customer's mind that they will always be the lowest in the market. On the other hand, A's solicitor, whose business is to secure consignments, gets around among the growers and courts the shipping committees and tells them that his house is not cutting the price, but that B, C, D, and E are sore because his house is selling more goods; because they have got the trade, and we fellows who pay the fiddler think because A is selling the most stuff he is the man for us. Why shouldn't he handle the most so long as he leads in cutting prices and educates the trade through his traveling salesmen that they will always bill under anybody else, and we are fools enough to furnish our berries and other products to do it with? We hope the strawberry growers throughout the country will, individually and collectively, investigate these things before another year. We should be able to say to Mr. A, B or C, as the case may be, so long as you are our receiver, we expect you to keep out of other receivers' markets, let the supply and demand regulate the prices, and each day take care of itself.

We now turn from these unpleasant complications to notice briefly the panacea for all these difficulties before we close, which is selling our berries on the track. We have been able this season to sell a number of cars on the track for cash. This is the kind of solicting that establishes confidence and makes glad the heart of the weary berry grower. This removes every doubt that any commission man will cut the price for he has his own money in them now. We could then return to our homes at night, after the car was loaded check deposited in bank for same, divested of all anxiety. Our slumber would not be broken by that awful fear that in the morning a wire would await us: "Car arrived in bad order. Berries soft, or sandy, or whiskers, or market glutted" and heaven knows what all. But, Mr. President, ladies and gentlemen and fellow fruit growers of Missouri, this happy condition can never exist outside of a thorough co-operation and union. These risks exist and must be taken. The commission man can not buy our berries and take these risks unless he is protected. We can not protect him without co-operation. As a rule a commission man could not afford to take the risk of buying berries from one association if another in the same locality was consigning berries to his competitor in the same market at the same time. But if all the associations in any section of the country that were supplying the berries for the trade during a given period were co-operating together and could assure the buyer that if he bought a car no other car would be allowed to go to his market unless it was bought, they would not hesitate to buy whenever they can have this assurance. This assurance can not be guaranteed without co-operation. With perfect unions organized in each strawberry growing district upon the principle of our confederation of states, each association having charge of its own business, conceding only the right of diverting cars, or doing it themselves when requested, whenever too many are about to be routed for one market, and the different unions are brought into touch with each other, we will be able to enjoy all the benefits implied in the subject of this paper, Successful Co-operation.

G. T. Tippin, Nichols, Mo.

GROWING SMALL FRUITS ON THE FARM.

While it is an item to grow a full supply of small fruits upon the farm, it is also an item to grow them as economically as possible. For this reason it is advisable to plant in long rows, far enough apart to be able to cultivate the greater portion with a horse and cultivator. On the average farm sufficient land can easily be given for this purpose, and 'next to the garden and truck patch' can be made the most profitable part of the farm, when the living is taken into consideration. There is no advantage in crowding; give the plants plenty of room. Strawberries may be set three and a half feet apart. Currants and gooseberries five feet. These should be planted near a fence or row of trees where they will be shaded at least a part of the time, not too near, or best results will not be gained.

Raspberries and blackberries should be planted five feet apart. Select a loamy soil, measurably rich and well drained. No kind of small fruit usually grown on the farm will thrive with wet feet.

The second year after setting out a new bed of strawberries is the time to set out plants to take the place of the old ones and to secure the most and best fruit with the least trouble. A new bed should be set out every other year. With raspberries a new bed should be set out the fourth year after the fruit and one every five years after that. It will be less trouble than to attempt to keep an old bed in good bearing condition. Currants and gooseberries will last a long time if kept pruned, the old wood cut out and clean cultivation given. Strawberries should not be allowed to bear fruit the first year. If any blossoms appear cut them off. The object is to secure a thrifty, vigorous growth, as this growth largely determines next year's yield of fruit. Mulch strawberries as soon as the ground freezes sufficiently to bear up a wagon.

Bagasse from a sorghum mill or wheat straw makes a good mulch. Leave the mulch on until the plants are done fruiting, when it should be removed and thorough cultivation given. Coal ashes make one of the best mulches for both currants and gooseberries, as they keep down the weeds and keep the soil friable.

With raspberries and blackberries a good plan of management is to cultivate during the early part of the growing season and then before hot dry weather sets in mulch well. The object is to grow the most and best fruit with the least expenditure of time and labor, and to secure a good supply for the longest season. This can best be done by a careful selection of varieties adapted to the soil and locality in which they are to be grown.

N. J. Shepherd, Eldon, Mo.

FRUIT FOR THE FAMILY.

There are horticulturists in this Society whose shoes I am not worthy to unbutton, and in this short paper I will only amuse them or set them to sleep, and confine instruction to those who have had less experience than myself. My location is in the Ozark Mountain region, and it is so much better for fruit than for anything else that it should be largely set to commercial orchards. We can not compete with more favored localities with corn and wheat, but while we can send our red apples beyond the seas we should not neglect our own families. It is a fact that where fruit is most plentifully produced it is not used most plentifully. To my knowledge there are those whose Ben Davis orchards cover hundreds of acres that have very few early apples or late keeping apples and no berries or other fruits. My plea is for a variety of fruit for the family and enough, so that three times a day for three hundred and sixty-five days and a fraction each year fruit in some form shall be on the table.

Its use is better than any medicine and its ounce of prevention beats the doctor's pound of cure. The acids of the various fruits in many cases prevents a longing for alcoholic stimulants. If fruit, then, is a health preservative and a preventive of intemperance, there is an abundant reason for this paper to come to the attention of the people who may not raise fruit or who may raise it solely for sale.

The location has much to do with the commercial orchard but not so much with fruit for the family. There are but few latitudes or altitudes in the United States, unless it be Alaska, where some kinds of fruits will not succeed. A flat in a great city is not a good place for fruit or a family either, but in these days of electric transportation a worker in a city may live out where he can practice some of the arts his ever-so-great grandfather Adam did ever-so-long-ago. It may be that fruit thus raised in a suburban lot may cost as much, or more, than its price in the market, but the physical and moral qualities acquired, the touch with mother earth that renews our strength and fits us for other duties make it cheap fruit.

It goes without saying that part of a farmer's land and part of his time should be devoted to producing fruit for his family. All men and women are not born horticulturists, but acquire horticulture or have it thrust on them. In either case they usually get a liking for it, take a few horticultural journals, which are always good, acquire a pile of catalogues from nurserymen, which are usually full of information, and often invest a few dimes in horticultural wonders that pay very small dividends. There is one fact in natural history that stands out in bas relief. A horticulturist often has patches on the front of his overalls, but never on the other side.

What kind of fruits shall we set out for family use? In this we must be guided somewhat by the available room and what succeeds best in the locality. It has been said that "God might have created a better fruit than the strawberry, but He never did." In May I devoutly believe this, but later on, when raspberries, black, red and yellow, cluster on the vines, blackberries load their bushes, peaches, pears and apples mature upon their trees and grapes purple on the vines, then I am glad that the Almighty did not stop at his earliest fruit.

In this short paper I shall not attempt to give any rules for planting or care of fruit, but only urge that the man or woman, or both, set their faces toward fruit for the family. Let not borers, wooly aphis, fungi, pear blight, grape rot, or any of these pests dismay you, but let plenty of fruit be your motto and your children will not be found pilfering your neighbor's fruit.

I. B. LAWTON, Bentonville, Ark.

THIRD SESSION.

Wednesday Afternoon.

Before the regular subject of this session was introduced there was a short discussion on the topic of distribution and co-operation as outlined in Mr. Tippin's paper.

Gardner.—Plans for this part of the fruit business have been laid out as the result of experience. Mr. Tippin and Cuningham, a Georgia man, reason alike. One hundred Georgia growers decided on a plan, the best point of which is the recommendation for selling fruit on the trees at the point of shipment. Strawberry crops in this vicinity sold at the station to the satisfaction of the grower.

Tippin.—The way of conducting the Southern Fruit Growers Union is to leave the business in the hands of each Association. The Union office took no control of the business of different Associations. Each one should divert its own cars when requested, under a penalty. The Union office gave them three or four more markets not supplied to choose from, if the one first intended was already filled. The local Association chose its own commission house.

There was a fixed rebate of three per cent on strawberris, twenty per cent of which went to the Secretary of the Union to pay expense of the office. If from one hundred cars there was money enough, that derived from extra cars was returned to the Association from which it came; and this has been satisfactory.

Next year we want Central Illinois, South Missouri and Central Missouri to be in touch because the fruits from these localities are on the market at the same time.

Some organizations have stayed out on account of misrepresentation, that would have come in if they had known. No individual is in control, it is mutual between the Associations. Individual should be informed to do business well, and as the idividual so the compact.

STRAWBERRY CULTURE.

Land should be as near level as possible, prepare by fall plowing. If the subsoil is loose, insuring good under drainage, subsoil plowing would be of little if any value, but if opposite conditions exist, subsoil to the depth of eighteen or twenty inches; broadcast about three barrels of salt to the acre as soon as the ground is plowed in the fall, this will destroy the white grub and other injurious insects. In spring as soon as ground will work well, go over the ground with a cultivator and then harrow until the surface is finely pulverized. Re-break land twelve or more inches deep and harrow until you have the soil perfectly pulverized. If you intend to cultivate in matted row, the rows should be four feet apart; if hill culture three and one-half feet. Set out the plants as early in the spring as you can get the ground prepared. The distance apart to set the plants depends to a considerable extent on the variety. Take for example varieties like Crescent, Warfield and Lovett, that throw out strong runners, if planted out the last of April or the first half of May, can be set at from three to four feet apart in the row (when the plantation is to be cultivated in matted rows), while such varieties as Parker Earle, that set but few plants, should not be over eighteen inches apart; if intended for hill culture all varieties should be planted out about twelve inches apart in the row. The cultivation should commence within one week after plantation has been set out and continue during the entire summer and autumn. In matted rows plants should stand from four to six inches apart with matted row about eighteen inches wide.

I use a spade in transplanting, also to cut runners off when I wish to keep plants in hills.

Varieties.—Crescent Seedling fertilized with Downing, perfect, has made me more money by half than any other variety tried by me. Warfield I would give the second place on the list for profit, and Parker Earle third. If your ground is rich enough to produce a good crop of corn, it is rich enough for such varieties of strawberries as Crescent, Warfield and Michell's Early; such varieties as Parker Earle, Sharpless and Bubach No. 5 succeed best on a light clay loam heavily manured. Hardwood ashes give slpendid results and is one of the best fertilizers for the strawberry. Ashes applied broadcast late in autumn or early winter just before mulching have given me best results. Where strawberries are only grown for the home table, the two best varieties are Michell's Early and Parker Earle, both perfect bloomers and will furnish fruit for the table during the entire strawberry season.

A. J. Davis, Jefferson City, Mo.

PICKING AND PACKING THE STRAWBERRY.

In the picking and packing of the strawberry we are each striving to get our berries on the market in the most economical way Experience has been a dear teacher to some, and many of us have learned valuable lessons in saving both time and strength.

It is important, where there are many berries to tend, to be thoroughly prepared for the picking before the strawberry season begins. There is then such a rush of work that anything that can be done before should be out of the way. First the amount of the yield must be estimated and the crates and boxes bought early enough for them to be made, and packed away in some place convenient to the patch.

Pickers must be engaged. If they do not come to you, you must go to them; for your neighbors are anxious for good pickers as well as yourself, and we each have our preference. We prefer girls and women as we have found them more careful than the average boy. It is easier, also, to keep the patch orderly where only girls are picking. So far we have found no difficulty in getting all the pickers we needed and we have generally kept them from year to year, increasing the number as we increased our patch.

Most strawberry growers advise having ten to fifteen pickers to an acre of berries, but so far, we have found, for an average yield, seven or eight will do the work, and they are better satisfied; for many of our pickers come several miles or board, and they are anxious to work as many hours as possible. We have found, too, that they do better work when they are making good wages. With fewer in the field there can be fewer in the berry houses and as we pay those working in the houses by the day this reduces expenses.

At first we pay our pickers a cent and a half a quart, but through the best of the season we give the regular price, one cent.

When the pickers first come into the patch the superintendent instructs each how to pick the berries. He shows them how to pick with the stems on and without pinching them, how to fill the boxes, and the condition the berries must be in for home or distant market. On the top of the box, as far as possible, we have the pickers turn most of the berries with the tips up.

For two years we hired the superintendent, but found it did not work as well as to have some member of the family to superintend. We have a personal interest in the patch and the pickers do not resent it when one of us goes over the rows or points out their mistakes. As much as possible, however, we leave them on their honor, and if one is found who can not be trusted she is paid off.

We have two packing houses this year for seven acres, and during the rush we have a packer and an assistant in each. The packer punches the cards on receiving the berries. We use Wallace's Berry Picking Record and the pickers hold the daily record until the quarts are all punched or nearly so. Then these are exchanged for the weekly record. At the house the condition of the berries is noticed and often the boxes examined to see if the berries are alike all the way through. If there is a lack in any of the boxes the picker's attention is first called to it by the packer and if it is repeated the superintendent speaks about it.

Most of our neighbors, in picking, use the carrier which holds four boxes, but after trying these we finally went back to the one-half bushel market basket. These stand more steadily on the ground and there is less danger of spilling the berries.

At the beginning of the season we make two assortments in the field; the firsts and the culls. With good sorting of the firsts, they do not need rehandling at the house. We have found it pays to pick the small berries and pay for them as for the others. These, with the soft ones, are dropped into the bottom of the basket and measured out at the house. These culls were often given to our pickers, for, strange to say, few farmers plant this choicest of fruits for family use. When there are but two assortments, firsts and culls, made in the field we sometimes re-sort, the culls at the house. We have found the basket a disadvantage in one respect; when the pickers are near the end of the rows and their boxes full they are apt to put the firsts in with their culls instead of returning to the house for more boxes. They are given to understand, now, that they are not given credit for these berries. As the bed is mulched every year there is not much danger of dirty berries or a muddy patch and as soon as the vines are dry the pickers begin their morning's work.

It is our aim to have the boxes as full as they can be and not be jammed in the boxes. Like apples, berries stand more pressing than one would think, although they must be handled more carefully than eggs. We try to have our boxes alike all the way through. When near the end of the season we have three grades, firsts, seconds and culls. In marketing the firsts and seconds are so marked, or we sometimes use another stencil in marking crates. Commission men who know our berries can then with a glance at the number know how we rank our berries. We also write the name of the berries on the crates.

Last year my brother felt repaid for the pains he had taken in picking and packing his berries. Toward the end of the season a letter came from a distant city thanking the grower for sending such fine berries onto the market and adding that what pleased her the most was the fact that the bottom berries were just as fine as the top. We also found it paid when we got the return, as they showed that good berries are appreciated.

We have a fruit growers' association in Springfield, and in shipping berries we learned several things which ought to be impressed on every shipper. The boxes should be full so that the berries press against the boxes above, or the crate cover. Several of our members shipped fine berries but did not fill their boxes. They wondered why their returns were so low. Another thing to avoid is the placing of two grades of berries in the same crate or box. The appearance of the whole is spoiled and they sell for less. Still worse is putting too ripe berries in the boxes. This is hard to avoid with new pickers as they can not realize that a handsome ripe berry is a cull, and the packers must watch for this mistake. "The Southwest" of May 20, gives the commission man's views of packing of fruit.

The strawberry grower, who grows the best berries and puts them on the market in the best shape is the one who is going to succeed. He may not make his fortune in the future as easily as he has in the past, but it is he who will receive the best market price; and it is the money in the labor that measures success with most of us in strawberry growing.

EMMA J. PARK, Springfield, Mo.

NEW FRUITS.

The Committee on New Fruits sends you the following:

STRAWBERRIES.

In many of the new ones I have been disappointed. Of course the excessive rains had something to do with the failures, yet each one had equal chances. I will commence at one end of the patch and comment on them as they stand along the line. Will mention all of them, even if some are not entirely new.

Enhance—Fair crop of fine, large berries.

Henry Ward Beecher—A very few of extra large, handsome berries.

Orange—Light crop, of pale color and berries of medium size.

Premers—Large and fine and a good crop.

Eureka—Large and fine and a good crop.

Epping—A failure.

Dew—Large berries but very few of them.

Greenville—A grand berry in all respects.

Plow City—The heaviest crop of big berries of any on my place this year.

Gertrude—A poor outfit this year.

Coles 134—About the same.

Davis—A good crop of medium-sized berries.

Pet—A beauty, but only bore a few berries.

Margarette—This is very promising; a large, fine, late one and very productive.

Wm. Belt—This has greatly disappointed me.

Meeks Early—A few berries of medium size, quite early.

Dayton—This pleases me and will be multiplied.

Smith's Seedling—A good, early berry of medium size.

Burt—This looks very much like Captain Jack.

Plants set out this spring have in most instances done better than those left in the bed from which they were taken, and can only be accounted for by their retarded blooming which gave them a better chance to pollenize.

Glen May—Large and fine, but only a few berries were left on the plants.

Vooreis—A large, splendid berry that I had once before, but got lost.

Ruby—The same condition as the last and is one of the berries we can *tie, too.*

Edith—Although on plant set out this spring is again the largest berries on the place, and it is productive, also.

Brunette—Large, handsome, fairly productive and of the finest quality for family use at home. This will be a big berry.

Earliest (Thompson)—This is, perhaps, the earliest we have; medium size, good quality and promises to be productive.

Darling—A splendid, early one.

Leaford—Promises well.

Sunny Side—A superb berry and will be pushed.

Haines Early—Did not fruit, so cannot tell what it may be worth.

Rio—One of the earliest and bids fair to get a place on the general list.

Nick Omer—A few of extraordinary, large, handsome berries.

Young's Seedling—A very promising one.

Howell's Seedling also shows well.

Clyde has come to stay.

Gandy is doing splendid this season.

But with all the new ones we are safe in sticking to some of the old ones. Crescent, Warfield, Beder Wood, Bubach and Parker Earle will all give plenty of berries if they get half a chance.

CHERRIES.

With a few exceptions these are a failure. Early Richmond and Black Morello have a good crop, and Delaware Bleeding Heart, this latter bore the first good crop this season and is well worth having, as the sweet varieties seem so uncertain. It is medium in size, dark red (nearly black) solid flesh and good flavor.

My Windsors, that I was watching with such interest, won't give me a chance to test, as they are all gone before ripe.

The host of birds inhabiting these parts will cheat me out of most of the best until I plant so many trees that they can't take them all.

Raspberries promise well. Miller's Early Red, Loudon and Cumberland have a fair chance to show their colors.

Cumberland is now double the size of any of the Blackcaps, but quite green yet. Miller's Early Red will be ripe long before Loudon, so that there will be no rivalry between them. The Miller is much more productive than the Loudon.

My Seedling Cuthbert that I was so much elated with last season is not as productive as I wish.

BLACKBERRIES.

Burton's Early and Sheer's Seedling are new with me and look well.

Minewanka and Erie are doing their best.

GRAPES.

Of these I have fruiting the Campbell's Early, a most beautiful vine and strong growth. The McPike I have just starting; also the Hosford. The latter, said to be enormously large and good quality, is also growing. Hicks, St. Louis and Kentucky are under way. All the vines of bearing size are looking well and promise a big crop.

The Columbian Imperial is setting fruit plentifully and this season we can tell what it is worth here.

But of all the grapes I have, the Ruby is about the strongest grower, immensely prolific and of the finest quality. Were it not for its tendency to rot I would deem it among the best. I gave it to a friend to test, who after fruiting, stated that it rotted badly and oh! how foxy. Now if my olfactory nerves are true there is no laxiness, about it but a rich, muscat flavor. The Fox grapes were plenty around me in the East and think I have a Fox grape. This Ruby will make canes twenty feet long in a season and half an inch thick. Young plants of cuttings, put in a year ago, cut back this spring, have now shoots five feet long and bunches of fruit on them.

PLUMS.

Gold Hale, Red June and Wickon bloomed, but no fruit set. The Gold seems to be a feeble grower, but the fruit is superb.

Bourbank and Richland are the only two varieties of plums that promise me a crop. There are a few of Louisa and Hawkeye, but not what can be called a crop.

PEACHES.

Of new ones we can not yet tell, but the Crosby and Champion have the fullest crops. Some will need thinning out.

PEARS.

Of these I have no new ones but Bloodgood, Garber, Kieffer, Shelding, Howell, Duchess and Louis Bonne have a fair crop. Easter Buerre has a slim setting.

S. Miller, Chairman.

NOTES ON STRAWBERRIES.

Of eleven varieties here this spring, in fruiting all opened out in fine shape and all set a fine crop of berries, although we had but one whole day and two half days of sunshine in three weeks while they were in full bloom. So, you see, fair weather has but little to do with setting a good crop of fruit, but high temperature has, and it was very warm all the time and rained at least every other day. So my opinion is, after eight years of very close watching, that if the weather is warm and the pollen is fertile, we will have a crop of berries, that is to say the question of buttons or berries is fertile or infertile pollen, same with imperfection in the female organs; as to the behavior of different varieties when the hot sun began to shine most every day, the Brandywine was first to go down. It just dried up, but it made the finest show in bloom of anything on the place. Next, Captain Jack dried up. Bederwood, not worth picking. Downing, badly rusted, but some fine berries. Timbrell had more bloom than fifty times as many vines could mature; so just a few berries, very large and about as rough as walnuts. Greenville bore a very good crop, but they are so close to the ground that it is impossible to get them without bruising. Crescent is a sight to behold, but it runs small too soon and goes down too soon in wet weather. Warfield is very fine, but overbore so badly that they are running small. The plant is very healthy. I like it better than Crescent. Parker Earle overbore so badly it was worthless. Bubach is very fine and perfectly healthy, but it does not last long enough with me. Though the berries are immense, it does not sell to my customers like Haverland. This outsells them all, holds its color better and keeps better than any one I have ever tried yet. It is healthiest, holds out longer for picking, holds its size better than any of them and has borne the most wonderful crop for four years in succession that any one ever saw. The amount it matures would be hard to believe if you did not see them among the new ones I have planted to try to get something to pick with Haverland. Clyde is the most promising. It is the most healthy, both in plant and fruit, of anything I ever saw. The berry is light in color.

Well, the most trouble with our berries here is having to compete with shipped berries. They sold in the county seat of Clinton county yesterday for fifty cents per crate. A friend of mine bought a crate Friday evening and he said it took five of them three hours picking them—just got enough for supper. Why do men raise such berries? Echo answers, "why?" What do they get in net profit from them? Echo answers, "nit." Merchants are ever dumping them into my crates and selling them as Odor's berries. I expect to publish them in the county papers if they do not stop it.

I thought I would send some berries to the meeting at West Plains, but just haven't time to do it right, but we can raise berries here as well as apples. The apple crop is a failure here as far as I have seen. Part of my young trees were very full, but have about all dropped. Some are old trees, but many of them ill shaped. Peaches curled up, except Amsden. They are the most healthy, both in leaf and fruit, I have ever seen. Many cherry trees that were very full haven't a cherry on them. Blackberries are fine. Raspberries, same. But much disease in plums. They swelled up like little balloons. As a whole, I think the fruit crop will be extremely poor in this latitude, with the exception of berries and grapes. Hoping you will have an enjoyable and profitable meeting, I am with you in spirit, if not in flesh, and I would like to submit some questions about my strawberries, if it is in order. Last spring, about the time the plants began to grow, something began to cut the leaves off the Bederwood plants as fast as the new leaves appeared. So they seemed to be lost or entirely ruined. I had a sack of Blood and Bone, so I sifted it on the injured rows until they looked brown, and that was the last of their work there and they came out and made a crop of berries but were too small for market. Now, has any one else had such experience with Blood and Bone for poison? Second, I noticed during the summer that something kept cutting the ends off the new runners on my new plant. So this fall I notice the whole surface of the ground full of holes about as large as a broom straw. What is it and what must I do to get rid of them?

I hope something of this kind will come up if I get there, for I want light on this matter badly. I have been growing strawberries for eight years. This is the first insect that has bothered me except the white grub and I know how to get rid of him.

G. T. ODOR, Holt, Mo.

LESSONS IN STRAWBERRY CULTURE IN 1897 AND 1898.

To begin with, I am entirely unable to do justice to this subject. I am not a good enough scholar to word my ideas pleasingly, even if I had any, and my time has been taken up the last month with other matters, so that I could not devote the thought necessary for a good article. I hope that those who hear or read these lines will not criticise too harshly.

We read in almost all guides for strawberry culture, shallow cultivation always, and much stress is used to persuade the reader to follow this practice. It is true nearly all writers say prepare your soil well, plow deep and subsoil. I fully agree with the latter. No plant should be planted without thorough subsoiling, just as deep as possible, but after this, shallow cultivation. Now here in Southwest Missouri we have a soil that when it rains excessively will pack very hard, and all the shallow cultivation we give will not make it loose enough again for the young plants to do well. In this case I advise the use of the double-shovel plow, and so-called calf-tongue shovels, and bear on the handles; plow deep and loosen up the soil thoroughly. It is well to bear in mind that no plants will do well in a hardpacked soil, at least I have found none that will, except the Russian Thistle. Shallow cultivation when the earth is loose and mellow, deep when hard, is my motto.

I had a strawberry bed planted in 1897. The tract had not been properly prepared before planting (I did not know what I know now) and about the middle of June the plants showed up very poorly. I made up my mind that they would be a failure unless something was done. I had them plowed deep both ways and the change was very gratifying to me. From that time on the plants did well, and I just finished picking a nice crop of berries from them, way above the average of those from new beds this season.

I should say something about what the different varieties do or have done, but am candid to admit I have not gone far enough in experimenting to give an opinion. I firmly believe that each variety requires different treatment to obtain best results. It would be well for all growers to experiment in this direction.

In regard to picking and packing I will say a few words. I think there are too many growers who do not know this themselves to properly direct the work. Each grower should pick some berries himself of each variety, and satisfy himself as to in just what condition they should be for best results. It is to be remembered that there is a great deal of difference in the different kinds of berries; some are ripe before they are colored, others color fully before they are near ripe, and trials should be made to determine proper time of picking. It is almost unnecessary to say anything about packing; every one ought to know that boxes should be well filled, all bad berries kept out, and just as good berries in bottom as on top.

J. F. Bartels, Neosho, Mo.

NOTES ON STRAWBERRIES.

Much has been said and written on the subject of varieties of strawberries, and much remains to be said and written. As long as search for a perfect plant, bearing a perfect berry is kept up, and the production of new seedlings is carried on, just so long will discussion of varieties continue and be of interest to the many growers of this fruit.

I have taken a deep interest in this matter for years and have tested many kinds. Last year I had seventy-three distinct varieties and, as it was a good year, all had a fair chance to show what they could do. I would not care to keep more than five or six kinds, if fruit for market were the only object.

From gathering and testing many varieties, in the past, I am now going more in the direction of cutting the number down to a few of the best. Last year, after fruiting was over, many of the poorer sorts were destroyed, and this year the same process will be continued. I hope in a few years to reduce my plantings to the least possible number of kinds without decreasing the amount of fruit produced or its quality. This can only be done by using a few of the best of the old tried sorts, and this is no easy matter, for every year one is tempted to try some of the new varies that are claimed to be so superior to old favorites as to soon take their place entirely. Each grower wishes to keep right up in the front, so the new varieties tempt him and he purchases them only to discard, in most cases, after a few years of trial.

Out of the varieties I have tested in fifteen years, the best ones I have found for commercial purposes are, first, the Warfield; second, the Gandy; third, the Parker Earle; fourth, the Wolverton; fifth, the Haverland.

There are many other good sorts for special purposes, e. g., Mitchel for early; Bubach, with high cultivation for home market, etc., but for reliable, all-round commercial berries, the ones I have named, are the best. On a different kind of soil, however, the list would probably need to be modified somewhat by a change of one or two varieties. My soil is limestone timberland or clay.

The Warfield comes the nearest of any variety to being an ideal shipping berry—the Ben Davis among the strawberries. It is good in all respects and its defects are few. The Gandy is large, strictly fancy, and on good soil has no equal in its season. The Parker Earle, on rich, moist soil, and with good care and cultivation, is a sight to behold. The yield is enormous; the berries large, glossy, firm, high-colored and of splendid quality. If this variety made more plants it would be well nigh perfect. The Woolverton, all things considered, is the best perfect flowering sort. have found suitable for pollenizing the Warfield and Haverland. It is larger than the Warfield, of similar color, and so can be picked with it. This is a heavy yielder, very strong in pollen and a good plant maker The Haverland is the heaviest yielder of all and a splendid berry in many respects.

If any one plants these varieties on good strawberry land and will give them proper care, they will not be disappointed, but will get better results in most cases than from the newer, high-priced varieties.

Of the comparatively new varieties I wish to notice a few.

The Brandywine, for which many and great claims have been made, I have had from the first, but will set no more of them. The berry is soft, dull-colored, and unattractive in appearance and hard to pick on account of a thick, tough stem. It was to have superseded the Gandy, but with me it is not one-half so valuable a variety. The Marshall has size, color and quality, but is so unproductive as not to be worth growing.

The Greenville has failed two years in four, and while it bore well the other two, it is not, in my judgment, as valuable a variety for home market as Bubach, and the berry is so soft as to disqualify it for shipping.

Many varieties introduced in the last few years are not worth mentioning, and should never have been known to the public. There is nothing of value in many of them or to them except the fact that they bring money to the introducer—in some cases.

I wish, therefore, to advocate the use of fewer and fewer varieties until, like Mr. Hopkins, of Springfield, we can reduce the number to one, two or at most three kinds, and by better care and cultivation get a more uniform and attractive product, and a more profitable return.

Z. T. RUSSELL, Carthage, Mo.

DISCUSSION ON STRAWBERRIES.

Barnes (Kansas).—In my experience of one hundred and forty pickers, one hundred and thirty-nine are unreliable. I can not ship without looking over the boxes. I do not agree with the half bushel baskets, but instead use a tray for the purpose, holding six or eight boxes and having feet about two inches high. Pickers drag the baskets along on the ground and mash the berries and soil the baskets.

Then there are too many inferior berries grown. We should have two grades, fancy and ordinary. Nor do I approve of the best berries at the top of the box; they should be all through.

Holsinger.—I am from Kansas and I am honest, too, but for twenty-five years I have put the best on top. I send a hundred crates into Kansas City each morning and I put them up to sell.

Tippin.—We had one commission man from Denver who preferred the berries promiscuous and not faced, but the grade should be strict, for if the fruit is a little soft it doesn't look so inviting. Of forty car loads in St. Paul those faced brought no more money.

If berries arrive a little soft, they look dead if faced, while if laid promiscuously, showing the stems, they have a better appearanee. Have never got one cent more for faced fruit and shall never face any more until I know I am going to get more money out of it.

Stedman.—Referring to Mr. Davis' paper, I have never heard of salt used for this purpose. It dissolves the ingredients of the soil and they seep away so that plant food is lost.

We can not fight the white grub successfully unless it is present in large numbers. Bi-sulphide of carbon injected into the earth will kill the grub and not injure either plant or soil. I would not advise the use of salt.

There are three insects specially injurious to the strawberry; the Tarnish plant bug, strawberry Crown-borer and strawberry Leaf-roler.

The Tarnish plant bug comes in the spring and is a sucking insect, but besides it pierces the plant and puts in some poison and this injures the plant. A single one will poison the entire young plant and fruit. It does not take the sap out but the poison is inserted. It troubles nearly all fruits. Pyrethrum will kill it. Get this from a wholesale druggist and be sure it is pure and fresh. Use a bellows to blow it on.

When powdered tobacco dust is on the plants bugs are not much inclined to touch them, but here you must guard against using too much.

The Crown borer-larva eats into the crown of the plant and two or three will kill it. The best way to get rid of this is to burn the patch over after picking; put straw over it and burn, this killing the larvae and pupae but not hurting the bed.

The Leaf roler comes after the crop and prevents more plants from growing. For this use one pound of Paris Green, and three of lime to a hundred gallons of water.

The first is most injurious because of the time of attack.

The Bi-sulphide of carbon costs ten cents a pound in fifty pound cans. One quarter of an ounce injected in dry ground (in wet it stays and will evaporate) in one place will certainly kill the white Grub and other insects in a radius of three feet. Inject at a depth of four inches and cover to prevent the fumes from escaping. Hogs will destroy this Grub, but also root up the plants.

The white Grub is numerous in new ground but rarely appears in numbers to attract attention. The Tarnish bug will attack a new field, the crown borer and leaf roller are apt to attack an old one. It is good to exchange fields in three years.

The burning over is harmful in a dry season However, it will kill the leaves and prevent evaporation and so no harm will be done, but the plant loses in vigor.

Stanley (Howell Co.).—Salt in strawberries is favorable for fertilization. I have used it by the car load, seven to nine bushels to the acre.

In the year of my using it I have found no injury unless it was too strong for the ground. I have put it on different things; put it on in the spring and harrow it in one to one and a half inches. Under glass it also does well, and gives good results with cabbage and cauliflower.

Nelson.—Two different times in 1894 in Missouri and in 1874 in New York we used one barrel of salt on an obstinate acre; we plowed for sweet corn; cabbage and potatoes and such crops were never grown. I took specimens to the Fulton winter meeting. On rich but worn out land in New York we used four hundred pounds per acre and had a fine crop of potatoes, and on fifty acres of Barley had fourteen hundred bushels.

Searle.—The proper way to cultivate for home use is to mulch with straw. After gathering sow to oats and they winter kill, fall to the ground and protect the plants and the berries grow up through so that they keep clean.

Snodgrass.—The way to mulch is by having rock on the soil.

Stedman.—Salt is a fertilizer, but an excess dissolves too much out of the soil. The correct amount will be good.

Holsinger.—Salt is death to vegetable matter except asparagus. It keeps down the weeds.

Dutcher.—A winter mulch is a necessity with all except Marshall. This is a wonderful grower, has large leaves and produces large plants, but is not prolific; it sends out its runners early, and, the fruit is too soft, Victor Hugo does not send out runners, but needs a mulch as also Bubach and Parker Earle.

Tippin.—At Springfield the best are Bubach No. 5, and Gandy.

At Monett, Warfield and Gandy, Warfield is the best all round.

Gladbury is a new one in South Missouri. The Clyde is fine, stands the drouth, and one of the most profitable. Ocean City is from four to five days later than Gandy. The shape and color are alike. If it proves to do well it will be valuable. Bubach is a good producer but not the shipper that Warfield is.

The object of mulching is protecting the fruit from the dirt at picking time. Wheat straw is serious, as later the rain brings wheat, hay and weeds into the beds. Prairie hay is always best. For small patches use the bedding from the barn where prairie hay is used. For cultivating wait until spring before mulching and it will give a larger yield. Afterwards burn off the mulch to get rid of weeds and kill the insects. After the drouth I set fire to the patch but thought it burned too bare, so did not burn all the beds. However, the patch burned naked is as good as that which was not, though the ground was so dry.

Murray.—At Sarcoxie last fall they mulched with wheat straw, but I heard of losses because of the dirt which washed over.

I tried prairie hay on a small bed and this spring the plants rotted. It is too heavy.

Wade.—If the mulching is deep the frost will hurt. I mulch none in field culture and very little for home. Crescent none at all, or sow oats. Crescent would make money, but this is past, is too small. I plant Bubach with Jesse. Gandy is safest for money, is large and firm on rich soil and in car load lots.

Goodman.—If you will sow cow peas in the fall they make a nice mulch. The object of a mulch is to keep the fruit clean and to prevent the plant being drawn out of the ground by freezing and thawing.

Dutcher.—Failure to mulch will ruin the beds. Spread the straw on after the ground is well frozen. The fall rains will carry out the seeds and cheat and free the patch from weeds.

Tippin.—Mulching by spreading is not practicable in large fields. With us the Gandy does not need mulching, but Crescent and Bubach are not good without it. Rain makes them soft and sandy without the mulch.

Prof. Whitten reported on seedlings at the Experiment Station.

The longer I experiment the more conservative I become in drawing conclusions. We must experiment more than one or two or three years; for series do not hold to their first promise.

Of sixty varieties thirty were taken six years ago, but only the female parent is known. Crosses were made also in which both are known. From these we have six promising and two very promising, but we must wait for sufficient evidence from good fruit growers before sending these out. There is a great difference in varieties as to their ability to stamp their characteristics on their offspring. Some have great power in transmitting good qualities. The Crescent leaves its impression more than any other pistillates. Sharpless most of the staminates. Warfield is not strong in leaving its impression. From the crossing of Sharpless and Crescent we obtained eighty promising varieties, one half of these were weeded out.

One difficulty has been that the work has been undertaken on too large a scale for man to keep record of. Another serious question is, if they are pollenated by hand are we sure that the best pollen is used. An interesting and profitable experiment will be to grow two varieties under glass and allow the bees to carry the pollen and so have a natural selection of pollen. Then breed these and the self pollenated and so keep a record of the per cent of good plants and their parentage, and be able to learn something of how to breed strawberries or perhaps accidentally find a good variety.

FOURTH SESSION.

Wednesday Evening.

The program opened with music and a charming encore by the Mandolin and Guitar Club, after which the Secretary read the paper that follows.

SOME PHASES OF HORTICULTURE.

This subject opens a wide field and demands a more fertile brain, greater versatility of talent and a more gifted pen than mine to investigate the facts, paint the beauties and delineate the variety of phases it presents to the inquirer.

It is full of sparkling gems, from which I select a few, as we "gather shells from the seashore," that may possibly amuse and entertain, but with no thought of edifying, the intelligent and cultured members of this old and honored, useful and indispensable society of horticulturists.

The phases of horticulture are many—rugged as a mountain, beautiful as a Madonna, variable as a coquette, changing with the rapidity of a drama, and often as alluring and deceptive as a mirage.

It has physical, intellectual, moral and spiritual phases, contributing to our necessities, increasing our pleasures, promoting our happiness, expanding the mental faculties, refining the moral sensibilities, and elevating the spiritual life; leading us to meditate upon the wisdom, goodness and love of God, thereby qualifying humanity for association with the higher orders of intelligent beings, "by the side of the river of the water of life."

Descending from the realms of fancy into the regions of fact, the first phase of horticulture that forces itself into consideration is toil. Unremitting toil—manual labor, that for development of muscular power and physical manhood is far superior to Sunday base ball, high school athletics, college foot ball, or university sculling and rowing races, and a thousand times more honorable and manly.

Toiling on from early morn until dewy eve—year by year, until, life exhausted, we fall like autumn leaves to enrich mother earth, teaching us that "from dust we come and unto dust we must return."

Dropping seeds, setting plants, shrubs and trees call into requisition muscular, mental and intellectual forces with their best efforts.

Buoyed up by hope, cheered by prospects and encouraged by promises we toil on until success crowns efforts and fruition rewards perseverance.

Our God-appointed occupation presents phases of the useful, beautiful and ornamental in the garden, small fruits and orchard, in the flower path, yard, lawn and park. The garden loading the table with the best half of our living, making the good housewife "happy as a big sunflower," while Pomona furnishes luxuries of every form, size, color and flavor from strawberry season until the swallows come again.

The beautiful spring scarcely lifts winter's white mantle from the earth ere Flora begins to beautify nature's green carpet with the snowdrop, crocus, violet and buttercup, increasing in magnificence with the more stately flowers until the queen of her realm, the stately rose, fills the air with rich perfume, makes home beautiful and the inmates happy. Not a soul in this wide world but is made better and happier by a plant in the window, a plat of flowers in the yard, or even a morning glory climbing over the rustic porch. A single flower gladdens the child, a bouquet awakens sweet thoughts in everyone, a few potted flowers makes the sick room cheerful. We place a bouquet on the still bosom, cover the coffin with wreathes and crosses of flowers, decorate the graves and ornament the last resting place of our lost loved ones with flowers, plants, shrubs and evergreens, sacred to their memory. Yearly the beautiful place of horticulture awakens fond memories as we place a wreath of immortelles over the dust of our loved, but not forgotten dead.

The ornamental phase is ever before us in efforts to beautify and adorn the yard, lawn, private and public parks.

The taste of an artist and the skill of an engineer are required to lay out and ornament the meandering footpath, the winding walk and stately driveway.

To adorn the babbling brook, silver lake and sparkling fountain, sylvan grove and cool grotto calls for the finest taste and skill of the horticultural artist, where the laborer may find a place of sweet rest, the rich enjoy their drive, the family a pleasant "outing," and the lover lay the wreathe of his heart at his idol's feet.

Returning again from elysian fields of recreation, beauty and romance to the stern realities of horticulture, the rugged phase of toil, weary toil, continually forces itself into view. With firm will, strong muscle and clear head we must cultivate, prune, train, gather and market the products, pocket the proceeds and rest on increased bank account, if perchance the labor has not cost more than its proceeds.

Yet there is remuneration more precious than increased bank account, as suggested by one member of this society whose fidelity to God and man is unquestioned. As he wends his way to market in the "wee small hours" of the night, beneath the twinkling stars, before the morning sun gilds the heavens and all nature is at rest, he says: "His soul seemed suspended in stillness and nearer to his Heavenly Father than at any other time." Conscious of his uprightness and the excellency of his products and acknowledging them as the gift of our beneficent Creator. How sweet must the communion and fellowship be, as the heart wells in praise and thanksgiving to the giver of all good! How precious the reward even though the bank account is not enlarged!

PROFIT.—Profit is the most enchanting and enticing, yet often most deceptive, and when compared with other lines in the broad field, agriculture certainly presents the more pleasing and delightful aspect.

No field in the domain of agriculture can compare (acre for acre) in profit with fruits, flowers and vegetables.

Comparisons are said to be odious. One or two will suffice. Farmers do well when corn yields $12 and wheat $20 per acre. Our most prominent fruit growers report from $100 to $300 as gross proceeds per acre of apples, peaches, pears and other large truits. The lowest I know of is $50. Small fruits yield as high as $400 and even more. Under my immediate observation is a 40-acre corn field and 1 1-16 of an acre of strawberries.

The corn field has brought $450 and the stalks for pasturage are worth $20. The gross yield of the 1 1-16 of an acre of strawberries has been $450 for the same two years.

One bed of 13-16 of an acre gave $465 gross over family use.

The average net on the corn, after paying rent and labor, was about $5, while the strawberries, after paying for rent, labor, crates and all expenses, netted about $200 per acre. Surely profit presents a smiling phase.

There is another phase, connected with utilizing (?) the surplus and unmarketable fruits for the increase of profit and enlarging the bank account, that "sows tares" which yield a large crop of vice, crime, misery and death—the wine press and distillery.

It is known that 80 per cent of crime in our country is traceable directly and indirectly to the use of intoxicants. We may reasonably ask if the members of society standing on a pre-eminently high plane of morality, virtue, purity, peace and good citizenship should engage in a business for the sake of profit that must sooner or later bring them into disesteem, distress to fellow creatures, and aid to fill jails and penitentiaries. I was born in the shadow of a stillhouse, raised behind a counter where drinks were retailed at 6 cents a glass, and have sold intoxicants myself, and know that from the "worm of the still" flows a stream of sin, crime, woe, misery, degradation and death.

ENTOMOLOGICAL.—There is a phase beautiful, interesting and delightful to the entomologist, that is dreaded and detested by all other fruit-growers.

There may be seen crawling, hopping and jumping all over it all kinds of insects, bugs, beetles, worms, curculios, gougers, flies, scale, snapping turtles, etc., of every description, color, shape and size—beautiful and hideous—delighting our worthy entomologist with their beautiful colors, wonderful forms, rapid development, singular transformations, astonishing increase and powerful destroying capacity.

The aphis, borer, canker worm, codling moth, tent caterpillar, gouger, rose slug, flea beetle, spider, fringed wing apple twig borer and a thousand other species to work on root, bark, wood, foliage, flower and fruit.

Between these and the horticulturist there is a battle unto death—death to them or his profits.

The entomologist has such beautiful scientific names for all of them that one would think they wouldn't harm the tiniest leaf, flower or fruit in all the world.

THE COMMERCIAL PHASE.—Men are dependent on each other. No one country produces all the necessaries, comforts or luxuries of life. International commerce is a necessity. Governments should encourage and facilitate exchange of commodities, adopting "free trade and sailors' rights" as far as consistent with health and prosperity.

Quite recently a hideous spectre arose before the fruit growers of America. A little man with a large conceit, his grandfather's hat and Achilles' sword decided that our fruit was dangerous to the interests of his subjects on the Rhine and decreed that they should eat no more American apples, and thereby knocked the bottoms out of 16,000 or 20,000 barrels, and sent $100,000 to the bottom of the sea.

It seems strange to a boy up an apple tree which his grandfather imported from Germany, that all at once the discovery is made in the "black forest" that apples the American boy grows fat on should be so dangerous to the health of his fourth cousin in "Faderland."

Perhaps removal of the beet sugar differential would restore our apples to health.

Brother Holsinger ought to use influence with his big cousin to get him to sheath his sword and rescind the edict so his kinsmen in Berlin could get some choice fruit from the "land of the big red apple" to give their children Sunday evenings after a carousal in the beer garden and wine cellar.

INTELLECTUAL.—We need only compare the clumsy and defective ways of the careless and uninformed with the skillful methods of the cultured and intelligent to discover the necessity and advantage of a well cultivated intellect, and a mind stored with information on its varied branches, to see the intellectual phase of horticulture. Whatever may be said of other occupations, no one can succeed in this unless his intellectual storeroom is as highly cultivated as his potato patch.

The moral phase may not be so clearly seen as felt.

Constantly associated with the useful and beautiful, we survey the wonders of creation, meditate upon the perfect adaptation of everything to the needs of animated nature and to the comfort, pleasure and happiness of intelligent beings, and wonder if it is all by chance or by design. If by design we look for the architect. And we are forced to admit that wisdom, goodness and love, far superior to the combined wisdom of the entire human race from Adam to this hour, drew the design, and we must look beyond man for power and skill to execute the wondrous plan.

When we meditate upon the goodness, perfection and majesty of so lofty a mind, we aspire to higher, purer and nobler life. When in "the dewy sweetness and reverential stillness of early dawn," or twilight's calm reflective moments; when flowers brighten the lonely places and the forests bless the earth with refreshing shade, as the trees stretch their heads yearningly heavenward, while their branches wave praises to the Divine, our thoughts are lifted to God, the great architect of the universe, and lessons of eternal truths are impressed on our minds. When we watch the growing plant, behold the harmonious and delicate shading of colors in flowers and inhale their sweet perfume; when we think of the innumerable kinds and variteies of fruits, with their limitless flavors, our thoughts are purified, our moral sensibilities refined, we are lifted to a higher plane and instinctively desire and aspire to associate with the pure, good and holy.

As we gather the delicate strawberry just below the line of eternal snow on Alpine heights, or pluck wild fruits from the mountain side, or wander by "cool Siloam's shady rill," where luscious pawpaws grow, or on the fertile plain gather the more substantial fruits that strengthen the body, invigorate the mind and sustain the nervous system, or in warmer climes, where cooling fruits of the tropics refresh the panting heart, our thoughts rise heavenward and our hearts break forth in the grand old hymn, "Praise God from whom all blessings flow," bringing us face to face with the spiritual phase of our divinely appointed occupation.

THE SPIRITUAL.—As we watch the seed germinate and the plant grow, bud, bloom, fruit and die; as we see the flower open, fade and fall away, the grass wither and decay, the leaves of the forest fall to enrich Mother Earth, while winter winds, through leafless boughs, sigh a solemn requiem over dead, decaying Nature, until vernal suns warm Earth's winding sheet, awake the joyous songs of maiden, bird and bee, arouse the sleeping and dead vegetable kingdom to new life, clothing the world in beautiful garments, we are taught the glorious doctrine of "life, death, life again," forcing the spiritual lessons of horticulture on our minds. Shall God so reclothe the earth with new life and beauty and not rehabilitate you?

In the beginning man was made a little lower than the angels, in the image and likeness of his Creator, and endowed with mind, soul and spirit—a mind to acquire knowledge, discriminate between truth and error, and to reason from cause to effect and from effect to cause; a soul to be moved by the emotions of fear, joy, sorrow, sympathy and love, and a spirit that desires and aspires to a higher, purer and nobler existence, and hopes that beyond there is a state where man shall never, never, never, die.

With his wonderful mental and intellectual endowments he has measured the distance to the sun, calculated the revolutions of the planets and determined their time and seasons; named the constellations, numbered the principal stars and foretold the return of comets. He has ascended high in the heavens and watched earth's beautiful panorama roll beneath his feet. He has descended into the ocean and brought forth the wonders of the deep. He has made the elements subservient to his will and administer to his comfort, pleasure and happiness. He has drawn the most powerful force of Nature from the clouds and made it warm his home, light his mansion and illuminate his pathway. He has chained it to his chariot wheels and made it transport himself and products, and by it communicates his thoughts to all parts of the world and talks to his friend in the uttermost parts of the earth. He has bottled up the eloquence of statesmen, the oratory of patriots and the sighs of distress; sealed up the inspiring strains of martial music, the thundering tones and soft cadences and sweet harmony of the oratorio as pealed forth from the great organ by musical celebrities, with the enthusiastic applause of delighted multitudes, to be repeated before unborn generations.

Time will not allow me to refer to his microscopic discoveries in the dark recesses of the unseen, nor of his powers by which he has analyzed the rays of light aad determined the component parts of the great luminary of day.

Can it be possible that death shall extinguish the vital spark and annihilate a being possessed of such God-like powers? Nay, verily! The annual revivification of nature, clothing the earth in a robe of beauty and the forest in a mantle of gaiety, is teaching us the glorious spiritual truth that "though a man die, yet shall he live again." Selah!

Every phase of horticulture teaches "that whatsoever a man soweth that shall he also reap." True in the natural world, and by analogy we believe it true in the higher domain of the spiritual.

"He that soweth to the flesh shall of the flesh reap corruption, but he that soweth to the spirit shall of the spirit reap life—life everlasting."

What are you sowing?

DAN CARPENTER, Barry, Mo.

Mr. A. J. Nelson sang and was heartily encored.

THE CANNING INDUSTRY.

Mr. President, Ladies and Gentlemen:

Having been assigned by your honorable secretary to deliver a paper on the subject of canning fruits, feeling my inability to do the subject justice, at the same time what might be one of the greatest industries of the State is being neglected. I feel like, in my feeble way, making an effort to place before the people of this State the great magnitude the canning industry might reach in Missouri if she will use the natural advantages she has in the industry. Missouri can be to the West what Maryland is to the East. The canned fruit industry of Maryland is almost the life of that State and of the great city of Baltimore, and Springfield might be to this State what Baltimore is to Maryland. As Southern Missouri is more naturally adapted to the growing of fruits and vegetables that we use in canning, namely: strawberries, raspberries, blackberries, and all other small fruits, apples and peaches, then corn, peas, beans, pumpkins, and, the greatest of all, the tomato, this is an industry that Southern Missouri has the advantage of over any place in the world; that is, they can be produced here cheaper, at profit to the producer, than in any place in the Union.

About ten years ago, when we organized the Republic Canning Company, we bought our machinery from a promoter, paid about twice what it ought to have cost, and bound him up to furnish a processor. As we knew nothing about the business we had to put him in as processor and manager at a salary of $1,000 per year, when we ought to have had a man for about $300. But the thousand dollars would not have hurt us if he had been the right sort of a man, but he was anything else. He was drunk nearly all the time. He made as many again jobs as necessary and the most of them for drunkards. I soon saw that he was going to ruin us. But how were we going to get rid of him. I laid the plan to get him to resign, and he resigned.

When we took charge of the business and found where we were, we found that we had lost about $4,000 and had a factory on our hands that had cost us twice what it ought to. And none of us knew how to run it. We had to do the best we could the balance of the season. Our misfortunes with our experts and paying too much for our machinery naturally made us very cautious. The first time I had an opportunity I became a member of the Western Packers' Canned Goods Association. I met with them the first time in St. Louis about eight years ago. One of the first things was to get acquainted with the members and find out what the machinery was worth and what kind we needed, and I found we had everything we did not need and but very little of that we did need. That is to say the machinery that we had we could not put up goods with for less than seventy-five cents per dozen and get out without losing money, but by studying the business I have been able to make many valuable improvements in the way of putting up goods by systematical methods, and many inventions of my own that I have put in use, leaving out the slow and bunglesome way that we had on the start, I can pay the same price to hands for labor and about the same price to the producer for produce and put up better goods at a cost of fifty cents per dozen to the factory. Having met with the Association annually till this year I met with the Atlantic States Packers' Association at Buffalo, N. Y.

Continuing my investigation as to the cost of all material and labor, I find that Southern Missouri can put up goods from five to ten cents cheaper on the dozen than any other place in the Union. In other words, Southern Missouri factories can make from five to ten cents on the dozen when others would be selling at cost. This would mean a twenty to twenty-five per cent dividend to Southern Missouri factories when others would not be making any profit at all. This seems to be our natural advantage, being able to produce the stuff cheaper and still leave the producer a better profit to the acre than any other section at a higher price.

Tomatoes in Southern Missouri will yield the producer, at $5.00 per ton, about $20 to $50 an acre, while other sections, paying $6 or $7 per ton, yield the producer from $10 to $25 per acre. This knowledge I have gained mainly from packers themselves, coming in contact with them annually at the meetings of the Association. Even the brokers have asked me how we could pack our goods ten cents on the dozen cheaper and at the same time make goods of a better quality than any other section of the country. I have but one answer: We have bumped our heads on all sides of the business and in so doing have learned the best methods of putting them up, as well as the natural advantages.

If you were going to put out a fruit farm I would not tell you to go to the average nurseryman for advice; I would tell you to go to the practical grower. So, if you want to build a canning factory, go to a practical canning factory man, who has made it a study and knows what you need, and if thoroughly practical he can make you thoroughly acquainted with the details of the business, namely: How to contract with the producers and how many acres to plant, and what kind of seed to sow for plants, how to plant and cultivate them, when and where to buy your material, such as cans, labels, boxes, solder, etc., and other things necessary.

I feel that there are many things for me to learn yet in the business. If I could have been made acquainted with all the details of the business as well as I could now make a man acquainted with them, I could have saved the company about $8,000 the first year in management and machinery. In the case of Winfield, Lincoln county, Mo., I could have saved them more than that amount. They came to me after they had made a failure and I made them thoroughly acquainted with the business and they went home and started up and have made a success ever since. I simply refer to this to show that the ordinary promoter knows about as much about the practical working of a canning factory as the ordinary fruit tree agent knows about fruit growing.

I have just finished a fine plant at Fair Play, Mo., and will presently superintend it this season. With the exception of a few machines which are patented I have had the machinery made under my own instructions and had many improvements made. In arranging the proper buildings and properly arranging the machinery the work will be done much better and cheaper that at any place I have ever seen. I also am having one put in at Nixa, Mo., on the same plans and with similar machinery.

Now, if we had eight or ten more within a hundred miles of Springfield we could arrange with some large catsup factory to locate at Springfield. Then all the different factories could use pulp machines and separate the pulp from the peelings, save the juice, ship it into the catsup factory and establish a big business there and leave a good profit to the factories. Even with what we will have after this year, a catsup factory would pay at Springfield, with a large cannery attached, so it could work all kinds of fruits, at the same time putting up the pulp from the different tomato canning factories into catsup. This would employ one or two hundred hands.

Another factory that is needed badly in Springfield is one to make cans, as it is true that we have to order our cans from the East. Many times they get delayed and we have to shut down for want of cans, as they will be on the road from three to twelve days. With a few more factories located in Southern Missouri they could keep a can factory running all the year with a force of 500 or 600 hands. With this would come box factories, label factories and a great jobbing trade. Some of our jobbers have built up a large jobbing trade in tomatoes. G. D. Milligan & Son, perhaps the largest wholesale jobbers in Springfield, have bought 15,000 to 20,000 cases, when a few years ago they would only buy from 1,000 to 2,000 cases. The Springfield Grocery Company, probably the next largest jobbing house, has increased their trade from 1,000 or 2,000 cases to about 20,000 cases, and all the others in proportion. There is not a business in Springfield that would not be benefited by this industry, and the laboring classes, especially. It will build up a large brokerage trade in Springfield. Already W. P. Stewart & Company have sold from 30,000 to 40,000 cases. They seem to be the only firm in Springfield that is doing a large brokerage business.

With the fruit and canning industry pushed in Southern Missouri as it has been in Maryland, the effect it would have on Springfield would be to double the business and population. It would clear the wild and rocky timber lands now lying idle and make them worth from $25 to $30 an acre. It would build better homes, better churches, better roads, better towns and better schools all over Southern Missouri, especially the timbered sections. The timbered land of Southern Missouri is the best tomato land in the world. T. W. WADE, Republic, Mo.

WOMANS' WORK IN HORTICULTURE.

In this intensely practical age, every undertaking is measured by dollars and cents. Our women are entering various professions and trades, business enterprises of nearly all kinds are commanding their attention, and I have chosen to treat the subject assigned me by your secretary, in a most practical manner.

Our president and secretary, and many other well known horticultural workers, have assured us there is money in this business, if properly attended to. Our surroundings, climate, etc., promise success, and even fashion, that autocratic dame, has declared agriculture to be the proper thing, and the very top notch of fashionable enterprises is horticulture.

Many other reasons suggest themselves *why* we should do this work, but I have mentioned sufficient. *If* we choose horticulture for our vocation, what part of the actual work may a woman do? What part *can* she do, and do well? For if complete success is won, it must be by superior work, or more excellent methods, and I think I voice the sentiments of the majority of women that when I take up any occupation usually filled by men, I shall do my work in a manner so wise and well, I shall overcome all prejudice opposing me, and shall, in this way, show my gratitude to those noble men who are helping and encouraging women to success in this work.

It is distinctly woman's work to be capable ot caring for the products of the orchard, so far as home needs are concerned; you will all admit that much, especially with the remembrance of the strawberry shortcake season just past, and anticipations of the melting peach cobbler in the near future. Most of you will even go farther and grant it our right to dry all the windfall apples the hogs can't eat, and encourage us to look after that part of the peach the curculio has failed to inhabit, out of which choice specimens we may artfully produce an *extra* fine quality of sundried fruit, that comes in handy to exchange for winter flannels. Some of you even go so far as to encourage us to wrap up and put away a few nice looking Kieffer pears, that the master of the house may sample about Christmas time, and see if it is really true they ever become fit to eat, after all we have heard about them.

But the new woman is not content with this. If taste incline, or necessity compels, she feels this is a line of work in which she may attain success.

The care bestowed by the American men upon their wives and daughters for generations past, surrounding them with the best productions of their hands and brains, have developed the natural taste and artistic instincts, that can be of vast use in this work.

How many busy wage earners in the great cities would pause to catch a breath of the outside world, so often totally denied them, when a basket of fragrant grapes, carefully and artistically packed, a few grape leaves edging the basket met their eye.

In sorting and packing, woman's deft fingers make her especially valuable.

All over our land her business ability and judgment are recognized, and she may as properly manage a fruit farm as a railroad, and I am glad to say she is doing both. You will say there is much work too hard for a woman, some she can not do. I would almost say there is no part of it she has not done already. Necessity, that stern parent of so much progression, has done as much for this work as any other.

There is a woman now living near where I do, who has cut down the trees, plowed the ground, planted it to fruit trees, cultivated and cared for them, raising a crop of farm products each year, and her orchard stands there as an evidence of what a woman *can* do.

This, you will reply, is an extreme case. Certainly, but a fact. I could name you plenty of men who have never done so much, who yet own and manage large fruit interests, and if women can so manage they need not do this part of the work, they may still hold rank among the horticulturists.

I am glad it is the fashion to admit that women *may* have both brains and muscles, for out of this combination will come the advancement of the future.

Women can, and do, go into the orchards, picking and packing, superintending and doing all parts of the work and doing it well. She may graft and bud, plant and prune, train the vine, and form the tree into symmetrical shape. She may wear brogans and a Shaker bonnet, and still retain those qualities that command respect and ennoble her sex.

I have heard much of Mr. Winan's 600-mile walk, that distance being necessary to travel in pruning his young orchard. What is a walk of only six hundred miles to the half fashionable women of our cities, who promenade miles of stone and brick pavement each day, with no object in view other than the passing of time to their useless lives? Or the busy girls behind the counters, who walk up and down all day, from one year's end to another, with six to ten miles walk to and from homes and boarding places for a rest? I know plenty of them whose lives are thus "walked out." But six hundred miles in an orchard, with the fresh air and sunshine, in a kind of a partnership with nature, and yet a distinct feeling that one can give even Nature points on how a peach tree shall be shaped, is an altogether different thing.

Few enterprises will show the effects of education more quickly than horticulture, and it is, perhaps, in this way that women can do the best work—a work that will go on long after the generation she taught has passed away.

How much the fruit-grower would be benefitted if well versed in the sciences pertaining to earth and air. There are so few of us who read from that old story book, Nature, as much as we ought, and yet how interesting it is. How the leaves unfold, how the rain becomes food for the plants, why leaves drop off, and how new branches are pushed forward, the flow of sap in trees, and thousands of things all around us. What a world of thought study of this kind opens up to us, and how the very grass under our feet becomes full of life and interest.

How eagerly children grasp studies of this kind, and when we have them in full sympathy with nature we have placed a foundation for future education that will stand. Education in its broadest sense means knowing how to think. Child training is now commanding much attention. Lessons early taught to children becomes second nature to them; and here women can surely do solid work in horticulture. If children are early led to read from nature, we will not need to spend so much time in later years on the subject of "How to keep the boys and girls on the farm."

The horticulturists of our State are most sincere in their efforts to put into shape this wonderful science and be able to furnish the youth with a hand-book containing the primary terms and knowledge of horticulture.

The committee on education of this society is getting together valuable information that every fruit-grower should be familiar with, and we hope to soon see the time when those desiring can have its use in the schools.

Women have done so much along educational lines that I was much surprised when the chairman of this committee told me, that thus far, the ladies have not been the warm friends and advocates, as was wished.

Surely it is only because they have not given it sufficient thought, or they would at once see the usefulness of such a work, and the great blessing an influence of this kind would become.

Woman's work in horticulture then is any part of it, from the planting of an apple seed to the teaching of the sciences; from the proper serving of a baked apple, to the exporting of our orchard products; from the teaching of the babe in the home to the training of a class in our agricultural college; from nursery songs to the press of the world.

With it all I would have you ever remember that—

> "Happy are they whose wish and care a few fair acres bound;
> Content to breathe their native air on their own ground,
> Whose fields with bread, whose herds with milk,
> Whose flocks supply them with attire,
> Whose trees in summer give them fruit and shade,
> In winter fire."

MRS. A. Z. MOORE, Cedar Gap, Mo.

A recitation and encore by Miss Thomas, of West Plains, were perfectly given.

FROM WILDERNESS TO CIVILIZATION.

Mr. President, Ladies and Gentlemen:

From wilderness to civilization. And first what is our conception of a wilderness, and what is our notion of civilization? A wilderness is a region uncultivated, and uninhabited by human beings, but which may be capable of sustaining a large population. It is a forest wild—hence wilderness, rather than a barren plain; and in proportion as human beings occupy it, reduce its state of nature, and render it inhabitable does it cease to be a wilderness.

Civilization is the state of being civilized, and to civilize is to reclaim from a savage state, while civilized means reclaimed from a savage life and manners; refined, cultivated.

From this you see my subject is large enough for a fourteen hours' speech, simply by way of introduction. But don't be frightened—I hope you will hear more concerning these things another day. To pass from this to that is a long journey; as great a one as the prodigal son had to pass over in order to come to himself, a journey only a few of us have yet made. In fact it covers the whole field of evolution, at least in so far as man has contributed to the changes from the savage to the civilized state. My subject either wittingly or unwittingly announces the law or method by which all great achievements are effected, whether on the part of the Creator himself, or on that of man, viz., the law of evolution; at least the workings of that law.

Passing to the changes by which our material globe was produced, all agree that there was a time when no life could be sustained. But as creation proceeded life began first in the water, and afterward on the land. Such plants and animals as could exist in each particular environment, did exist, and when they could no longer be sustained, they perished and their remains contributed to the rock and crystal portion of the globe, while other creatures adapted to the changed conditions appeared. If you want proof of this, examine the remains of the rhizopods, sponges and corals that make up the rocks on the Snodgrass fruit ranch, and then get acquainted with his entertaining family.

When therefore from the formless and voidless condition that once was, the first wilderness, capable of sustaining a population, emerged, man who was first in design but last in execution, made his appearance, and began his work of making the "wilderness like Eden," and in some cases the "desert like the garden of the Lord." The rapidity of his progress would depend upon his condition when he appeared. Some say man was "perfect in form and heaven-crowned with the noblest attributes," "but degenerated to a being who had only the reasoning power of the child, and the helplessness of a mindless creature." Others say man came up from a "mindless creature," through the "reasoning power of the child," to a "perfect form," to be "heaven-crowned with the noblest attributes" of God. Take your choice each for himself. Those of you who think you always belonged to the F. F. V.'s, enjoy your halucination; as for me I prefer the ascending to the descending series. But you will notice that these separated and largely antagonistic schools agree as to the helplessness in which "man began the real battle of life, with all the forces of nature apparently arrayed against him." With slow developing intellect and with slow and faltering steps, "the race began its march toward improvement."

Of these early beginnings we *know* but little for the record is incomplete and much of that obscured by reason of its great age. A long period anti-dated the history of the race called the prehistoric period. This period is usually divided into the Stone age, the Bronze age, and the present or Iron age; or if we consider man's mode of life, the period is divided into that of cave-dwellers, cliff-dwellers, mound-builders, and nomadic peoples. Between these classes there is no well defined line of demarkation. Abraham belonged to the Stone age of his people and was a nomad; and to-day we have cliff-dwellers in Central America, and lake-dwellers in South America.

In the remote period of which we speak, natural caves made by the winds and waters furnished houses not only for the wild beasts as they do now, but also for the little more humanized cave-dweller. As the race increased, and the demand for more caves was pressing, the scanty skill of man was brought into requisition, and the results, I have seen and you may see, in the abandoned homes of the cliff-dweller of Arizona. The same existing in Colorado, New Mexico and south through Old Mexico and Central America.

These primitive men subsisted upon a simple fare of meat, at first, raw, but afterward cooked. For when they saw the lightning bolt strike down and set on fire some deadened tree of their native forest, they soon learned some of the benefits of that burning wood. They saw the sparks fly from the flint as they prepared their arrow-heads and tomahawks, and soon reasoned that the friction produced not only lightning in minature, but heat also. This simple "suggestion produced most splendid results, and advanced man more signally than any other accident in nature. With fire the cave and cliff-dwellers were enabled to provide the double comfort of warmth and more palatable food, and we now see them preparing their daily fare of flesh, nuts and berries."

These people did but little to subdue the forest, open up the country and invite immigration from neighboring states. When they had gathered their modicum of fire wood, and laid in a few saplings for handles to their battle-axes, the timber was left to grow in all its native luxury. But not so with the lake-dwellers. The solitary life of the cave-dweller disappeared as men developed into the higher state of tribal life. No longer forced to infest dens and caves for protection, "the desire for more comfortable shelter was followed by the ability to construct dwellings." They at first built their houses on piles driven near the shore and in the shallows of the lakes. With a draw-bridge that could be taken in at night, or when an enemy appeared, a good degree of safety was secured.

But such structures required timber; and thus they began to fell the forest, to open up fields, at first unintentionally, and to prepare the way for agriculture. The dug-out, the original canoe, and the wooden plow soon became necessities, and thus navigation and agriculture were born, twin sisters of equal age, rocked in the same cradle, grew up together, always united in life, and are to be separated only in death.

Civilization now began in reality. Men began to prepare homes and the family idea was born. Arts and laws, always indicative of social advancement, had now their earliest beginnings. Man's progress then as in all ages was marked by the development of the human intellect. "No longer merely hungry animals, prowling around in hopes of being able, by skill or chance, to kill some animal which might supply them with flesh and rough clothing," they added to their diet of flesh, nuts, roots and berries, grains and vegetables, for now tillage had surely begun. Agriculture in its earliest beginnings as well as now, implied peace, home, quiet, meditation, foresight, as well as regular labor which always brings contentment.

Again, as the crude dress of fig-leaves had been supplanted by the more durable robe of skins and furs, so they were in turn largely laid aside for the linen cloth of the early manufacturers. Thus both the animal and the vegetable kingdoms were made subservent to the wants and wishes of man. Pottery, knives, hatchets, saws, mill-stones and farming implements multiplied, and soon a farmers' life became the most independent and envied by all.

Was this a long time ago? We have said Abraham belonged to the Stone age; and Zipporah, in the second forty years of the life of Moses, used a sharp stone to circumcise her child. The Stone-age both rough and polished exist to-day. Cave-dwellers and cliff-dwellers are yet to be found, and the mound-builders are still at work piling up huge mounds of stone in the Snodgrass vineyard. It was only three hundred and forty-seven years ago this very month since the first European foot-print was made on Missouri soil; for it was in 1541 that DeSoto, a Spaniard, crossed the Mississippi where Memphis now stands, proceeded north along the west bank and reached the place where New Madrid now stands, in June of that year. From that point he went west for two hundred miles. This would naturally bring him through this very county and on to about the middle of Ozark or Douglass counties. From here he went south into Arkansas, for it was gold he sought and not fruit land. A fearful mistake!

Only two hundred and sixteen years since LaSalle, a Frenchman, explored the Mississippi river from the mouth of the Wisconsin to the Gulf. The trading posts soon afterward established, were of necessity short lived. And it has been only one hundred and forty-three years since the first permanent settlement was made at Ste. Genevieve.

St. Louis was founded one hundred and thirty-four years ago, and the Missouri *Gazette*, the first newspaper, now the St. Louis *Republic*, was founded only ninety years ago. It has been only eighty-two years since Missouri was made a territory, and she has been a state only seventy-eight years.

These are not marvelous figures in the minds of the old people of today. Indeed do we not see the "dug-out on our western prairies, the cavern home in the Rockies, and the primitive cabin, not a whit more comfortable, in our own loved Missouri even now? The truth is when we think how short the time has been, we wonder that so much has been done to convert the primitive forest of the Ozarks into the attractive and desirable homes we often find even remote from the railroad. Only a few years ago the sturdy immigrant began to enter these jungles, to clear away a few square rods—a mere patch—just as their prehistoric brethren had done, to build a cabin hard by a spring of pure living water, to dig up the earth in spots and to plant a patch of corn, with bean or "punkin" seed ofttimes in the same hill. A few hogs properly called razor-backs and rail-spliters were gathered up, and hog and hominy, long-green tobacco and moonshine, of course imported from Arkansas, constituted the principal diet of our brave and hardy pioneers. But such a state of affairs could not always last. Some of "wife's people" came out from Indiana or elsewhere, and brought along some ripe apples, and may be a few peaches. The seeds were planted, and oh! what peaches and apples did that fellow have to take back to his loving mother-in-law, when he got able to make the first trip home!

When he returned he brought out some blackberry, raspberry and strawberry plants, and a little bundle of yearling peach, pear, apple and plum sprouts. He learned how to graft and bud, and soon he had a small fruit garden, and an apple orchard. With it came health and wealth and happiness heretofore unknown in this mountain home. This family was fit to survive and it did survive. It is the type of this class who are setting the pace in developing the glorious fruit interests in all this the land of the big red apple.

Much yet remains to be done. Not all are as "well fixed" as those just considered. Some of our farmers are yet plowing their corn with a shot-gun and a dog, and washing their hoe-cake down with "cypress juice." But these things can not always be. Progress, development and higher civilization will be achieved by the most of us yet. Every one fit to survive will survive and the day will come when every farm, however small, will have its family and market orchard. Not all orchards can be large, and they should not be, but by association and co-operation the small fruit growers can market their products as advantageously as the proprietors of the Olden Fruit Farm, which up to a few days ago I thought was the only one you had; but now I see "the woods are full of them." No land owner is too poor to make a beginning. Everyone of them is better off than his prehistoric brother, and we know, that barley, millet and wheat, apples and pears, hazelnuts, beech-nuts, wild cherries, plums, raspberries, blackberries and strawberries, were known to the lake-dwellers.

Just when the cultivation of fruits began we can not tell; but I wish I had the time and the ability to furnish this association a treatise on the culture and development of each of these delicious fruits and others too, with which our state and especially the southeastern slope of the Ozarks abounds. Young people, begin a systematic study of these things. Begin to-morrow by hearing what Professor Whitten has to say on Home Studies in Horticulture. It will do you good. In your social circle you will always have something with which to entertain your companions. No longer would you have to resort to senseless games, doubtful plays, and amusements more or less harmful in order to entertain and to be entertained. You would be prepared to supplement the work of your fathers in their labor of making the great wilderness of South Missouri to blossom not only as the rose, but to multiply the blossoms of apples, pear and peach; of plum, apricot and cherry; of the nectarine and of all the berries, till every foot of this vast region once wholly a wilderness, shall be cultivated and made capable of supporting a population vaster than that of the Greater New York and of London combined, so vast that all the Spaniards of Europe and of the islands of the sea can not whip us in a thousand years.

C. H. DUTCHER, Warrensburg, Mo.

THE STRUCTURE OF PLANTS AND THE RELATIONSHIP EXISTING BETWEEN THE ROOT, STEM AND LEAVES OF A TREE.

To best understand the relationship existing between the root, stem and leaves of a tree, 'it is important to have a clear conception of the development, structure and functions of these parts.

The root is but a single axis in its first stages of development, but soon branches out in search of food and to more firmly fix the plant in the soil. This primary axis or tap root may continue to grow indefinitely or may cease when only a few weeks old, all depending on the character of soil and habit of the plant when under cultivation. The lateral roots continue to grow as long as the tree lives. All roots increase in diameter in much the same manner as the stem, by the formation of new layers of cells just beneath the bark. They elongate, however, by the addition of new cells at the tip end and by the lengthening of the cells for some distance back. On the newer portions a very large number of root-hairs are produced, which gradually disappear as the roots grow older and others are constantly being formed on the younger growths. Root-hairs never appear on old roots. The bark of the roots is generally quite thin, so that one often grows into another in much more irregular form than the branches. It has been recorded that different trees of the same species will grow together under ground, so that when one is cut down its stump will continue to live and even increase slightly in size from the nourishment it derives from the other tree. (Hough, Elements of Forestry, 76, 1882). Just beneath the bark of the older portions of the root is a cortical tissue which serves as a protection and a storage for food. Within this tissue are bundles of elongated cells or vessels which conduct the crude sap upwards; next comes a central cylinder which corresponds to the pith of the stem.

In most plants the crude sap is taken up by the root-hairs, from which it passes through the cortical tissue into the elongated cells or canals, thence upward through the stem and to the leaves where it is acted upon by light and air and then distributed through the growing parts of the plant. The function of the root-hairs then is to absorb the liquid food from the soil—their large number greatly increasing the absorbing surface. They are especially numerous in the large-leaved species, while some trees with narrow, tough leaves, such as the pines, have very few or even none at all. As above mentioned they never appear on the older parts of the roots, thus illustrating the importance of young root growth in transplanted trees. This new growth may be secured by frequently moving the plants from the time they are quite small, thus securing a large number of root tips that can be preserved through the process of transplanting.

The stem forms the medium of communication between the roots and top. There is no well marked line which separates the root from the top but the one gradually merges into the other. It is not necessary for us to distinguish between trunk and branches, as the structure and functions of both are nearly identical—both taken together are called the stem.

In its development, the stem grows upward by the elongation of internodes, or that portion which afterwards develops into the parts between the buds. These internodes increase in length by the formation of cells at their ends (or nodes as the ends are called), on which the new buds are formed. Thus growth occurs in as many places as there are nodes (or internodes), as indicated by the number of buds on the current year's growth. After the first year, growth in length of each internode nearly or entirely ceases. As compared with the root, therefore, the stem grows by the lengthening of a number of sections, which are formed in the bud while the root increases in length at or near the tip only. In thickness, however, the stem grows in much the same manner as the root, by the addition of new layers of wood just beneath the bark in what is known as the cambium.

In structure the stem of most trees is differentiated into three well marked layers, namely, bark, wood and pith. The pith or central cylinder appears to be essential to growth in the young twigs, but after the first or second year does not seem to be of any use and may decay and afterwards disappear altogether. Surrounding the pith is the wood, which is subdivided into heart-wood and sap-wood, outside of which is the bark or protecting sheet. The crude sap in coming up from the root passes through the sap-wood to the leaves and the elaborated sap returns through the cambium.

A leaf is an expansion of the cell tissue of the stem, the veins being a continuation of the vertical fibrous vessels of the sap-wood, through which the rising sap is taken to every part of the leaf, thus forming a direct communication with the lower part of the plant. The primary function of the leaves is to prepare the food which has been absorbed, either through the roots or through the leaves themselves, for building up the plant structure in much the same manner as food is prepared by the stomach and lungs for the growth and sustenance of animals. It is essential that the food thus absorbed be exposed to the action of light and air, the great number of leaves thus afford a large surface for the purpose.

Having now a general idea of the structure and functions of the roots, stem and leaves, let us consider more especially their inter-relationship. As the life of a plant is seated in the sap, it follows that its vitality depends upon the proper circulation of sap, or in other words, when the normal flow of sap has been severely checked, a feeble circulation follows and the whole plant is ultimately weakened. Again, as the amount of absorbing root surface is in direct proportion to the leaf surface, it is very evident that if a considerable portion of the roots are cut off without a corresponding removal of top the circulation will be injuriously effected and the whole plant subjected to a state of unrest. Much of the food supply is cut off while the evaporation remains the same and a great effort of the plant is demanded to readjust itself by sending out new roots. The roots may be cut so close that the plant will not be able to throw out new ones, in which case fatal results will follow. It must not be understood, however, that the plants will be affected in this manner when moderately pruned. On the other hand root pruning may be, and is, practiced to the great advantage of the plant, when there is an over-production of wood. Unfruitful trees may ofttime be made productive by this operation when not carried to excess. An excessive pruning of the top also tends to upset the natural balance of the tree, and in order to readjust itself an abnormal top growth takes place. These facts, therefore point out the importance of top pruning in proportion as the roots have been cut back in transplanting trees, and also teach a principle that it is best to prune moderately and often rather than at long intervals.

H. C. IRISH, Mo. Bot. Garden, St. Louis.

FIFTH SESSION.

Thursday Morning.

BUSINESS MEETING.

The opening prayer of the day was offered by the Rev. G. A. Pease.

The secretary then read a letter from Mr. G. A. Atwood on the display of Missouri at the Omaha Exposition, and one also from Superintendent A. T. Nelson.

Omaha, Neb., June 6, 1898.

Hon. N. F. Murray, President State Horticultural Society:

The horticultural commissioners at the Trans-Mississippi Exposition send greetings to the State Horticultural Society in convention at West Plains. We hope your meetings will be largely attended. We know they will be pleasant and profitable to all present.

The Trans-Mississippi Exposition will be a grand thing for Missouri. As you are aware the exhibits are not nearly ready. It will be two weeks yet before all the departments are arranged. Still there are many visitors daily. Our horticultural display on the opening day was complimented by all. Our big strawberries won the favor of the ladies, and your fellow commissioner and assistant, A. T. Nelson, could not resist the appeals for a sample. We have a fine apple exhibit and the two hundred and thirty jars of fruit from the Agricultural College forwarded by Prof. Whitten, is a great addition to our collection. The twenty-three evergreen trees contributed by Jas. B. Wild & Bros., of Sarcoxie, help us out greatly. We have them placed around on exhibit. Have refused several offers to part with some of them.

We find that it is quite a task to keep our plates filled with fresh fruits and not a little expense, but your agents here propose to stand by grand Missouri by doing their best to make a good presentation of all that is contributed to this department. It is of the greatest moment that the fruit growers of Missouri contribute a supply of their best berries, peaches, apples and other fruits, for we have strong opposition. California, Kansas and Nebraska, with large appropriations and extensive furnishings, join us, and Colorado, Iowa and Illinois are making extensive preparations. We can not afford to be indifferent. Every Missourian should help with money or fruit.

August 30 will be Missouri Day. It is hoped that twenty thousand Missourians will be in Omaha on that date; that each will wear a decoration, and it is the purpose of our horticultural commissioners to have a carload of peaches and a car of apples to give away on that occasion. It is expected that the railroads will give a special rate for Missouri Day.

Your commissioners, in behalf of the State, extend thanks to the liberal fruit growers who have sent us fruit. It is a pleasure to acknowledge that Mr. Arthur T. Nelson. our superintendent for the season, is admirably qualified for the work. Hoping your meetings will stimulate further interest in the Trans-Mississippi Exposition, I am

Sincerely Yours,
G. A. ATWOOD,
Chairman Horticultural Committee.

Omaha, Neb.

It is Sunday morning and we are out in our exhibit getting things in shape for this afternoon as we expect a large crowd. Our exhibit attracts a great deal of attention. We see a great many Missouri people up here and they all say when they get to our exhibit that they are at home.

I wish you could see our display. We have three hundred and twenty-six plates of apples, two hundred and ten plates of strawberries, and twelve plates of cherries. We give the ladies a strawberry on a toothpick. People come along and say: "Well, here is poor old Missouri's display," but I tell them they are mistaken, it is Grand Old Missouri. Kansas, Montana, Iowa, Oregon, Illinois, Colorado, Nebraska and Douglas Co., Neb., are all working on their exhibits. They all tell me they are going to try to down Missouri. I give it right back to them and tell them we can beat the world.

A. T. NELSON.

At the request of Pres. Murray, Vice-President, D. A. Robnett, took the chair while Mr. Murray added a short account of the display at Omaha at the time of opening.

Pres. Murray. We have nice tables finished in white enamel, with evergreens and flowers around for decoration. There are 200 plates of strawberries and cherries. The name Missouri we made in red apples.

California is making a magnificent show and our exhibit is next to it, in fine shady location. Other states have space but no other than California with her specialties and Missouri and Nebraska with their apples had any show. I am very proud of our start and heard many complimentary exclamations at our display.

There is an importance attached to this occasion, for we are showing our fruit right in the jaws of our great Northwestern Market. A good one for all kinds of fruit. A gentleman from Illinois, when he was starting home, said he had been looking around and was agreeably surprised in the Missouri showing, and that when he get's rid of his investment in wild lands he is going to buy in Missouri and ship the best in season.

We were enabled to give away some strawberries. The variety of our display added to the attractiveness. We want cherries, gooseberries, currants and peaches as soon as they come in. The charges are paid by the State, and every county is given credit for its contribution, and record will be made of every one *who sends* fruit for this exhibition.

Reports of committees were then heard.

The Committee on fruits made awards as follows to

I. P. Campbell, West Plains	$ .50
D. A. Robnett, Columbia, for apples	3.25
A. Nelson, Lebanon, for cherries	.75
	$ 4.50

F. Holsinger,
H. S. Wayman,
C. H. Dutcher.

AWARDS OF COMMITTEE ON FLOWERS.

Mr. W. H. Stanley, for a choice collection of greenhouse plants and cut flowers for decorating and ornamenting the hall	$ 15.00
Mrs. J. T. Snodgrass, for choice Phoenix Palm and other decorative plants	4.00

We also find a large number of cut flowers not entered for award but for decorative purposes by various persons, who are entitled to especial thanks for their consideration.

W. W. Serl, Chairman,
Mrs. A. Z. Moore,
Mrs. Orr.

Place of Winter Meeting.—Invitations to the Society were received from Mexico, Kirksville and Kirkwood.

Prof. Whitten presented the invitation from Columbia and the University.

Mr. Nelson invited the Society to hold its forty-first annual meeting at Lebanon, and pledged a free hall, entertainment at homes for visitors, one dollar a day at the hotels and half fare on the railroad.

Mr. Erb said he would be delighted to have the Society hold its winter meeting at Cedar Gap, but suggested that Columbia was a most excellent place, as the Experiment Station is there, in which all are interested and from which we can learn so much.

Mr. Robnett.—The M., K. & T. goes straight to Rocheport and from there we will have good transportation to Columbia.

Mr. Goodman.—The M., K. & T. will give a half rate and this will influence other roads.

Motion was made and carried to leave the final decision with the executive committee.

Change in the Constitution.—A suggestion was made toward a change in Article II, requiring persons to be members of the Society for one year before being allowed to vote for officers; as, under the present ruling, any locality could elect all the officers and keep the meeting at one place. Some societies have had this trouble, though Missouri never has.

A motion was made to adopt the change.

W. H. Barnes (Kansas) remarked: Kansas has made a similar change, but I think you ought to except Life members, as they ought to have all privileges immediately on entering.

Mr. Evans.—As a substitute for the motion to adopt the change, I move that a committee of three be appointed to confer and report on this at the afternoon session.

On the second of Mr. Snodgrass this substitute motion was carried, and the president appointed J. C. Evans, J. T. Snodgrass an F. H. Speakman as committee.

REPORT OF SECRETARY.

Eleven, only eleven years ago these very days, this society came to West Plains for its summer meeting, on June 7, 8 and 9, 1887. We came then as missionaries, as we often go to other places, and planted some seed then that has been in good ground and has brought forth some thirty, some sixty, some one hundred fold. Behold! What see we? Mountain and valley, hill and plain, rocky slope and smooth vale, are all transformed into beautiful orchard, vineyard or berry plants. These thousands of acres of blackjacks have been changed by the magic hand of the horticulturist into trees that bring forth fruit beautiful to look upon and sweet to the taste.

Surely has it been shown true, how wonderfully doth the hand of man change nature, how doth it "mend nature," how doth he bring forth the trees to blossom and fruit, not where one stood before but where none were before. Surely the horticulturist hath made this country to blossom as the rose.

All along this railroad, which runs through your beautiful country from Springfield to the southern limits of the State, you can see orchards, orchards, orchards, until it would seem almost one continual orchard for a hundred miles. The blackjacks, the deer, the wild turkey, the wood tick, the little jigger, have given place to the fruit trees, the cows, the chickens, the berries, the flowers, the grass, and beautiful and happy homes are all over our land. I have a peculiar interest in this land, because I was with the first who came down here to spy this land out in 1884, to locate and plant the largest planting that was ever made in the State up to that time.

At our meeting in 1887 the room was filled with flowers and fruits. We had a few of the early peach Amsden. Raspberries and dewberries were on the tables in abundance. Cherries were ripe, and a large lot of apples nearly grown to show their size and perfection. Plum branches, peach twigs, pears, showing how great was the prospect for fruit.

How much have we done during these last eleven years? What has been the work of the society? How have we kept pace with the times? In my report to you then I was urging the organization of county societies as the best means of letting your light shine, and to-day we have in our last report sixty-two societies and these are not all; many have not sent in their report and we have not the list.

In 1887 we were away down the line of fruit-producing States, while last year we stood first in the production of apples, in number of barrels and in amount of money obtained for the same. The peaches, pears, berries and grapes brought into the State thousands of dollars, which we were in need of and glad to get. To-day our State stands third in rank as to the value of its fruit crop, California and New York only leading.

Since 1887 we have made a number of fine exhibitions of fruits, much to the credit of our State. In 1888 we made the display at the St. Louis Exposition for forty days and used in that display over five hundred bushels of apples. At the close of the exposition we had upon the tables one hundred and twenty-five bushels of the finest apples that were ever brought together by our society.

We made a showing at some of the American Pomological Society meetings in a small way, just to convince them that we were alive, and here obtained a medal as our reward.

In 1893 you well know of the display we made for six months at Chicago at the World's Fair. The results of that show will never end, for we are hearing every year of the incoming tide of immigration as a result of that effort. In 1894, and again in 1895, this society took hold of the large art room at the St. Louis Exposition and there made two more fine displays, which lasted for forty days and forty nights—a beautiful exhibit in which all the fruit growers were generous enough to send in fruit to keep up this display to the honor and advantage of their counties. These displays cost much time and labor as you well know if you ever tried to show three thousand five hundred plates of fruit.

Now our latest effort is being made at Omaha, where some of our members are busily engaged in showing the fruits of Missouri as they ripen. We appeal to you now to take hold of this latest show and help to reach those people who want to come where they can get fruit to eat. There never was a better time or place for an exhibition to be made than this one at Omaha. First, it is at the proper point for us to reach the people we are anxious to reach. These people of the Northwest are just the ones who want to go south and yet not too far south, and the Ozark region is about their limit. Again, this Omaha exhibit will not be lost in a sea of vastness as was the one in Chicago. Here at Omaha we see a beautiful miniature Chicago exposition, and every exhibit that is made will get the proper attention and notice. The one was so large that all of us had to make an exhibit, yet how much of it was lost in the vastness of the show and only a passing notice was paid; this one is the place where every good exhibit will get noticed and where our show will do us the most good. I believe this is an opportune time to do good work in advertising our location, our counties, our State.

The exhibit has taken shape. Our society has a space about 30 feet square and there we have some of the nicest shelving in the hall put up, and some good tables arranged in the form of a Greek cross, on which are placed the berries, apples and the jars of fruit. This jar exhibit was sent from the Agricultural College and has in it some very beautiful specimens and a large number of new varieties. It also embraces an educational exhibit, put up by Prof. Whitten at Columbia, that will pay any fruit grower to examine and study well for the lesson it teaches in regard to fungus diseases, insect life, new varieties, and the new plan of preserving them, Prof. Whitten has improved the jar exhibit very much and has renewed much of it, so that now it is, and will be, the most attractive exhibit on the grounds. On the opening day Missouri stood at the top with the most complete fruit exhibit on the grounds and received the unbounded praise of all who saw it.

TRANSPORTATION

This is the great question which now confronts the fruit grower. It is no more a question of " how to grow fruit," but " how to get it to market profitably." It is not necessary for me to say to you people that our railroads have in their own hands the " making " or the "breaking" of these fruit districts. I wish I might give you special facts in regard to this matter to show how wonderfully some localities have grown up with the assistance of the railroads and how thoroughly destructive has been the policy of other railroads. The Illinois Central and the Mobile & Ohio are notable instances of the one and the Chicago & Alton and the Wabash of the other. If these railroads will take these matters up and in connection with the express companies and with telegraph communication there is no reason in the wide world why any part of our country should want for fruit at any season of the year. Year by year we are getting a little closer to the solution of this question, and it will not be long, I believe, before we will have a systematic plan for successful action in this matter. It will take a good strong company to take hold of this; have all of its agents under bond and guarantee the full return for the fruit sold. No fruit grower objects to a low price once in a while, but he does object to being swindled. How this can be done the most economically and successfully and profitably is the great question for us to discuss, and I want to heartily commend the paper presented by Mr. Tippin and the discussions we have had on this topic.

What shall be the future work of the society? Well, I do not know if we can do any better in the future than we have done in the past. Our machine is the best that can be made and it is kept in good running order and it is doing good work. The only great problem, as intimated a moment ago, is, " How best and cheapest can we market and transport our fruits to the consumer." We are fairly on the road to knowing how to grow, yet hundreds are continually asking us how. We are sure, fairly sure, of how to plant, cultivate, prune, gather and pack our fruits. We know some of our insects and fungi and how to combat them. We know something of the location of orchards, what is best soil and subsoil the first plantations should have, but then we have to go over and over with these same points each year, because there are hundreds of new comers who want to know the same thing. Some ask, why does the society repeat the same things each year, and I ask, why does the school teacher repeat the same lessons every year? Why do we go over and over our same routine of planting, plowing, pruning and planting each year? Why do the seasons come again each year? Simply because all the good things come from the every day routine of life, the daily repetition over and over again, it seems necessary for us to continue if we would succeed.

L. A. GOODMAN.

REPORT OF TREASURER, A. NELSON.

Paid out.			
Jan. 3, 1898.	G. B. Lamm, expenses to Jefferson City	$ 12 00	
	W. G. Gano, expenses to Topeka, Kan	9 65	
	A. Nelson expenses to Springfield, Ill	30 20	
	Warrant No. 384		$ 51 85
Jan. 28.	Express $1.15, cold storage $9.05	10 20	
	P. O. Bills $5.00. $10.00.	15 00	
	Salary of Secretary $66.66, Typewriter $20.00	86 66	
	Warrant No. 385		111 86
Feb. 28.	Express $2.65, $0.55, $1.10, $2.30, $2.45	9 05	
	For Massachusetts Ploughman	1 00	
	Repairs on Typewriter $2.00, P. O. $10.00	12 00	
	Salary of Secretary $66 66, Typewriter $20.00	86 66	
	Warrant No. 387		108 71
Feb. 28.	J. C. Evans, expenses to Lincoln, Neb	16 25	
	Hudson & Kimberly, Printing	21 45	
	Warrant No. 388.		37 70
March 31.	P. O. Bills $4.00, $10.00, $10.00, Express 50c	24 50	
	Membership Books $2.00, P. O. Cards $4.25	6 25	
	Arbor Day Circular	2 00	
	N. F. Murray, expenses to Platte City	7 00	
	N. F. Murray, expenses to Kansas City	4 00	
	Hudson & Kimberly, 4 M halftones	7 80	
	Salary of Secretary $66.66, Tpyewriter $20.00	86 66	
	Warrant No. 389.		138 21
March 31.	K. C. Engraving Co., 5 halftones (cuts)	56 40	
	Warrant No. 390		56 40
Apr. 28.	P. O. Bills $5.00, $16.00	21 00	
	Express $2.00. $1.25, 45c, 90c, $1.15	5 75	
	Scotford Printing & Paper $4.00, $7.50	11 50	
	Salary of Secretary $66.66, Typewriter $20.00	86 66	
	Extra help on reports, proof, etc	32 00	
	Warrant No. 391		156 91
May 3.	Tribune Printing Co., $27 00, $8.00	35 00	
	Pacific Express Co., on reports from Jefferson City.	117 39	
	Warrant No. 392		152 39
May 30.	Express 90c, dray $1.75, Scotford $11.50	14 15	
	P. O. Bill $10.00, Freight $14.80, Papers $5.80	30 60	
	P. O. Bill $80.42, Salary of Secretary $66.66	147 08	
	Typewriter $20.00, L. A. Goodman, expenses to Neosho $4.00	24 00	
	Warrant No. 393		215 83
May 30.	Scotford S. & S. Co., 1 M Book envelopes	10 50	
	2 M Circulars $4.75, Labels and Cards $11.50	16 25	
	2 M Circulars $4.75, 1,500 Programs $10.00	14 75	
	Hudson & Kimberly, 10 M Letter Heads	40 00	
	8 M Envelopes $12.00, Express $2.75	14 75	
	Warrant No. 394		96 25
June 27.	2 M Labels $2.50, Dray 25c, P. O. Bill $27.95	30 70	
	Salary of Secretary for June $66.66, Typewriter $20.00	86 66	
	Warrant No. 395		117 36
June 27.	Premiums at West Plains	25 50	
	Expenses Dr. H. Ayers	26 35	
	Expenses L. A. Goodman	17 75	
	Expenses N. F. Murray	33 00	
	Warrant No. 396		102 60
June 27.	Expenses D. A. Robnett	18 20	
	Expenses A. Nelson	21 75	
	Paid Society expenses West Plains	58 20	
	A. Nelson, P. O. Bill	3 80	
	Warrant No. 397		101 95
	Total Paid Out		$1,448 02
Received.			
Dec. 23, 1897.	From last report, Balance	337 53	
Jan. 3, 1898.	Cash from State Treasurer	971 13	
May 3.	Cash from State Treasurer	504 73	
June 27.	Membership by A Nelson	17 00	
	Membership by L. A. Goodman	31 00	
	Total Receipts		$1,861 39
	Total Paid Out		1,448 02
	Balance in hands of Treasurer		$ 413 37

We, your committee on finance, have examined the accounts of the Treasurer and find them correct, according to his report, receipted bills and vouchers for all accounts.

J. C. Evans,
J. T. Snodgrass,
J. B. Speer.

June 8, 1898.

The reports from local societies and various districts came in the way of verbal reports from members present.

A. Nelson—(Laclede Co.)—Some varieties of fruits will have a fair crop. Peaches stand from 75 to 80 per cent, where they are well cared for. Our society does not have many meetings, but tree-planting continues. This spring there have been more peach trees planted than ever before. At other points I find the same as in Laclede county; the trees bear lightly that had a full crop last year. Some that were loaded will never bear again, because the fruit was not thinned.

W. A. Irvin—(Greene Co.)—Our society has regular monthly meetings. There will be 50 per cent of a peach crop, 40 per cent of an apple. Ben Davis is nearly a failure on account of over-bearing last year and the drouth. One eighty-acre premium orchard has many dead trees. The Elberta peach and Japan plums are failures. The Ingram apple held its own. Forty per cent is a large estimate for the apple crop, it will probably not be over twenty-five. Last year taught us a lesson that the day is not far distant when we must irrigate at times when the apples are maturing, in the warm season. I am preparing for this now. We will also need to thin out the apples on the trees; this gives good crops and leaves the trees alive.

L. Erb—(Wright Co.)—Were not the apples hurt more in the cold weather of May than by drouth. This is so at Cedar Gap.

Mr. Irvin.—Drouth is the worst.

C. H. Dutcher—(Johnson Co.)—Apples are nearly a failure and Ben Davis totally so. There are a few Huntsman, Jonathan, Limber Twig, Geniton, Snow and White Winter Pearmain. These were hanging well filled until all the apples turned black and fell, when they were about as large as peas. This is caused either by imperfect pollination or twig blight. There are no Baldwins. Willow Twig promised well, but are none now. Peach crop is fine and cherries abundant. Berries are fine, but strawberries will be one-quarter of a crop. On a small path that was irrigated last August, September and October, the crop is fine. We lost many apple trees, those that were fullest last year, and took out the large ones by the roots and put in new ones; others are dying now. I agree that we need to irrigate at dry times.

G. T. Tippin—(Greene Co.)—There will not be over 25 per cent of an apple crop, nor over 40 per cent of peach. Summer and fall varieties of apples have set well. Ingram promises well.. The prospect about May first was good. Missouri Pippin bore full last year, so are but few now.

H S. Wayman—(Mercer Co.)—The fruit prospects are better than in South Missouri. Apples will be 70 per cent. Peaches are not many, but better than usual at 40 per cent. Small fruits are good. Our County Society is resurrected from a dead one and there is a strong interest. Many are turning their attention to Commercial orchards for profit.

Dutcher—Nurserymen have never done so well as this year.

J. B. Speer—(Bates Co.)—We have no society anymore. Apples are not good. The county is in the hands of capitalists, and the farmers are renters. Old orchards are dying out and no commercial ones are being planted.

W. W. Henry—(Bates Co.)—There are no prospects for a crop, the drouth killed some trees and others are not over it yet. Ben Davis trees are half killed, others have no fruit and there will not be over one-tenth of a crop.

J. E. Thompson—(Henry Co.)—Prospects same as Johnson county. Peach will be 20 per cent.

D. A. Robnett—(Boone Co.)—There are no hopes for winter apples. Will be some fall varieties and some Missouri Pippin. Ben Davis are gone and Jonathan nearly so. Peaches have to be thinned 50 per cent to give others room, but few had these trees. I cultivated through the summer and had a mulch on by fall, and the commission men came to Boone county and payed the money asked for them. The damage was done in May, still we had 600 barrels more than expected. This year's rain in May ruined the bloom and we will have not more than 10 per cent of apples. There are more men interested now than ever and more capital.

W. A. Gardner—(Howell Co.)—Eight-year-old Ben Davis are so affected as to give but half a crop. The seven-years will have a large crop. Wine-sap is a failure and Missouri Pippin almost so. Clayton full, York full and clean, Jonathan full, Rome Beauty, fair; also, Huntsman, Peaches are full.

Moseley (Olden)—There will be 20 per cent of apples. Ben Davis were heavy last year and in spots are well loaded now; others are only 10 per cent. Peach crop is about 50 per cent, somewhat spotted. Some will need to be thinned. The old and extremely young have scant crop. The middle aged are good this year. A few died this year, some last year, but are now replaced with new trees. There are two causes for the apple failure. The rain during blooming season was detrimental, and last season was severe on apples, as we had no spring, but jumped from winter to hot summer, and this took the vitality of the trees, so that they did not mature the crop, nor produce good fruit buds this spring. Cherries are light and dropped badly. Pears also short.

Erb.—Trees died this Spring because of disease and the drouth hastened it. Healthy trees did not die,

Moseley.—I agree with Mr. Erb, but let trees be effected with insects or root-rot and such a season will kill them out, whereas in a good season they would have borne a good crop and had vitality enough to recuperate.

W. H. Barnes.—In Kansas the prospect as a whole is fair, some are falling more than usual, which we lay to the rain in blooming time.

Wellhouse agrees with this and says that later rains affected those that were well pollinated.

Peaches are crowded. Berries not what was expected. The drouth affected the fall growth of strawberries. There are not many trees dying.

The experience of Kansas apple growers is to be put into a book. Among reports from 275 growers, the best come from the western part under irregation. These find ready sale at fair prices, as a dollar to a dollar and a half per bushel. These were purchased in the orchards and the growers made money.

J. C. Moore—(Wright Co.)—Some trees dug up from the roots were dead from root disease, there were large borers in the roots. Young trees also have decayed roots. Some are dead two feet above the crown and the root is alive, i. e., Willow Twig. General looks are good, but there will not be more than 20 per cent of a crop and this on the south slopes and tops of hills. Peach crop is 100 per cent.

L. Chubbuck—(Caldwell Co.)—I have seen a large number of orchards with wheat in, and two with clover. If these were sown and the wheat and clover let lie for a mulch which orchard would suffer most from a drouth?

Ans. Wheat.

W. H. Loomis—(Wright Co.)—Peaches will be a good half crop, cherries fair, plums rare and apples fair.

The cold storm and sleet at blossoming time injured both cherries and plums. The rains during the time of pollination hurt the apple crop. Cherries as large as peas were found without a stone in them; it is supposed that they were eaten out by worms.

The Mt. Grove Horticultural Society sent a case of strawberries to the opening of the Omaha Exhibition.

Mr. Murray.—The strawberries sent from Mt. Grove were monsters and very fine. Of the several varieties the largest was Bubach.

Mr. Vale—(Arkansas.)—Arkansas raises the finest fruit and Missouri steals it and takes the premiums. We raise apples on the Mississippi and only seedling peach trees. There is not one strawberry for market but will grow.

We wish the Missouri people would come and start up our virgin country.

Question—Can Ben Davis apples be packed in barrels and not slack in cold storage?

Mr. Goodman.—They can be but not one in a hundred is so packed.

Mr. Erb.—The whole barrel must be repacked both on account of the apples and the slackness.

Question—What trees are best, next to apple trees?

Mr. Goodman.—Apple trees are the best, others along the road do more harm than good.

Question.—Why has grafted wood a blacker heart than other?

Prof. Whitten.—One is not blacker, but unfavorable conditions cause the heart wood to decay.

Question—Is a tree infected with Wooly Aphis any good to plant?

Ans. No good at all.

Pres. Murray—(Holt Co.)—Some Ben Davis are good and some Winesap. A crop does not depend on conditions. Peaches are full. There are no large peach orchards but people wish they had them. The average for peaches is as good as for apples. There is no complaint of dying trees, and no serious suffering from drouth.

We planted eight acres of Ben Davis on a ridge, these were all cultivated in corn for three years. On side hill the clover was not cut for five years and trees are large, the foliage dark and have a fine crop, while on the hill they are sickly.

In Andrew county a twelve year orchard was for eight years in clover, mulched a little and I never saw better Ben Davis.

Red clover left to seed itself and using that for mulch is, I think, grand.

The chief danger with clover is from fire. Fight ground mice with English rat-terrier. The trees in clover are second year from planting, cultivate for two years and put in fifty stock hogs to forty acres, they will have less cholera, and be larger and the tree have fewer borers. For cultivating use a single or double cultivator, requiring but little hoeing. Break land with a plow before planting. Use Haine harness and short singletree and small mules.

H. S. Wayman.—We use Steele harness for six-year-olds.

H. E. Moseley—The trouble with clover is it goes to timothy. I prefer wheat, as it tears out the roots to kill the timothy.

Mr. Murray.—We don't have that as timothy does not gain on clover.

Mr. Gardner.—In plowing do you cut off the surface roots?

Mr. Murray.—Do not plow with a turning plow unless shallow to kill weeds.

Mr. Erb.—In plowing up the clover we found no surface roots, yet the trees were in good condition.

KNOX COUNTY.

BARING, May 28, 1898.

Mr. L. A. Goodman:

Dear Sir and Friend:—I hereby thank you for the copy of the fortieth report of the State Horticultural Society of Missouri, as also of the prospectus of next meeting to be held at West Plains. It has been my ardent wish to be present, some time, at one of your meetings, so as to be able to form acquaintance with you and other veterans of horticulture with whom I am familiar in reading their discussions in the reports you kindly send me yearly, and which I appreciate higher than anything in the line of horticultural reading. The thanks of every fruit grower in the state is due you and all those great laborers in horticulture, who attend your meetings, who tell us how to succeed, and how to avoid failure, you have my humble thanks. As I am somewhat hard of hearing your reports are more beneficial to me than to be present at the meetings, but am with you in heart and spirit. I hope you will have a very interesting time at West Plains, as that is in the heart of the great fruit belt of our state, and I might say of our great country. If I were a young man I would wish to locate down there, to live among fruit growers, so as to be able to consult with men of experience, to compare experiments, etc. I am sorry to state that in my neighborhood, I have not one man of any experience to learn anything from. Most of my neighbors love fruit and plant, and generally let nature take care of what they plant, and it is strange to say that fruits generally do well enough even under neglect, which goes to show what could be accomplished with care and high culture. I am sorry to have to report that fruits of nearly all kinds have dropped, since blossom time, off from 50 to 95 per cent, which is a great damper on our expectations, as I never saw a heavier bloom than we had this spring. Well we must be thankful for anything we may get, let it be ever so little. We had a wet spring and much cool and chilly weather during blossom time, which no doubt was the cause of the blossoms blighting and aborting. I will close with best wishes for an interesting and happy meeting at West Plains.

Yours fraternally,

PETER DAILING.

LINN COUNTY.

MEADVILLE, MO., JUNE 4, 1898.

L. A. Goodman:

Dear Sir:—The prospect for an apple crop in this county is very poor; the trees bloomed well, but the continued cold wet weather, I think, must have prevented the pollen from fertilizing the blossom. The same may be said of pears. Peaches, plums and cherries promise a fine crop. I have observed that trees under which chickens run are affected but slightly by the curculio, while other trees are badly damaged. Grapes, blackberries, raspberries, strawberries, gooseberries and currants will be an average crop. I have found that the best preventive of anthracnose of the raspberry is to select strong plants and grow them three or four years only, then grub out and burn. The young plants seem to have enough vigor to resist attacks of the disease. Everything is in the weeds here on account of wet weather.

G. P. TURNER.

VERNON COUNTY.

NEVADA, MO., June 5, 1898.

Mr. Goodman, West Plains, Mo.:

Dear Sir:—As the horticulturists of our state are now about to convene, and I presume all are interested in the fruit crop in general, I will just say that the crop in general in Vernon county will be a light one. The strawberry crop, that is now about gone has, on an average, not been over one-fourth of a crop. The raspberry crop will probably be half a crop, now just beginning to ripen. Blackberry crop now promises about one-fourth of a crop. Apples, in several orchards that I have been in, will not yield over 25 per cent at most; my own orchard about the same. I think the continued rains must have destroyed the pollen and caused the fruit to fall off. Plums and cherries are also a light crop. Peaches are not grown extensively as in South Missouri, but all the trees I have seen are well loaded, while the strawberry crop has been such a light one; still, prices have not held up which, of course, makes it hard on the growers. The season has been an extremely wet one, and has greatly delayed farmers with their spring work. Wishing you all a pleasant and profitable meeting, I am, as ever,

Yours,

J. H. LOGAN.

TRANSPORTATION.

Reasonable transportation means almost the success or failure of fruit growing in the Ozark region.

How best to reach the consumer of our fruits in the best and most economical way is the question of the hour with the fruit grower.

This question in a much more serious light has been partly solved by the fruit growers of California. Yet it still remains their greatest difficulty to profitable fruit growing. The solving of this problem depends not only on the Railroads and Express companies, but on the Horticulturist as well as fruit growers of California found when wrestling with the question. The growers of fruit must learn that transportation on inferior fruit costs just as much as on prime fruit. Yet the value is probably but a fourth or fifth as much as the former.

Because we succeeded in the past in marketing our common fruit at fair prices at home with little or no competition, is no reason why we should persist in the same methods when we have the whole United States to compete with.

Therefore the first important point is to grow prime fruit as near as possible and only ship such to the market.

We should use the most suitable packages in which to send our fruit to market and in the most attractive form, then when we have done our part, we should join hands and request the best rates possible for the grower, for in union there is strength, and no transportation company will ignore any reasonable request from the representatives of so important an industry. But there must be thorough organization, local associations with proper officers selected from the growers with a central association at the most important point of distribution; send representatives from the local associations to the principal markets and place a competent man at the head to direct matters, with an executive committee to manage him and we feel that the fruit grower will be amply protected.

W. A. Irvin, Springfield, Mo.

SIXTH SESSION.

Thursday Afternoon.

Subject.—"Stone Fruits."

The first topic for consideration was Peaches. The basis for discussion was given by two papers.

PEACHES.

LOCATION, PREPARATION AND DISTANCE.

Our worthy Secretary in mapping out a series of papers upon the subject of "*Peaches,*" called on the writer for a paper upon the above heading to introduce the subject to you. As an obedient soldier, loyal to the duties and interests of our State Society, I comply to the best of my ability. Not asking why I am called upon for such duty, or why he did not call upon those whose knowledge and practical experience far exceeds mine.

But being called, I offer the following thoughts and suggestions. Not with the expectation of escaping criticism; not expecting to give you anything new, or with the idea of instructing the practical and successful Peach Growers of the Ozarks here assembled. But with the idea perhaps, there may be some poor Rip Van Winkle who has just awakened from a twenty years sleep and has became concious of the fact, and believes that there is a future in store for the Missouri Peach and is seriously thinking of planting his first Peach Orchard. To such a one, if any present, I would dedicate this paper, feeling that if it is the means of starting one man right, I will be amply repaid.

In conclusion of my introduction to the subject, I wish to say, I promise you brevity. Too many weeds in my Nursery this June first, to think of taking up much time writing essays, but to my subject, the first division.

Location.—This question confronts the planter in the beginning. Where shall I plant my Peach Orchard? Shall it be in the valley or upon the hill top? Shall it be upon the North slope or upon the South, upon the East or upon the West? Where shall I plant? I answer, always plant upon highest, most elevated land you have. As to the best slope or exposure, I prefer East first, second choice North, and the Southwest least desirable of all. You ask why. I answer elevated land, is generally speaking better drained, dryer, less exposed to damage by late spring frosts. Trees are later in blooming on the East and North slopes. The fruit gets more sunshine and a dryer atmosphere on a high elevation and color better. Valleys drain off the cold and damp atmosphere the same as it does the rainfall from the elevated ground. After the question of location is decided upon and disposed of, the next part of the problem is the *preparation of the soil* which is also of great importance and not to be neglected. We would begin by plowing the ground if possible in the fall, following the breaking plow with the subsoil so as to get the ground broken fifteen·to twenty inches deep. Again you ask why. I answer because fall plowing in this manner breaks up the subsoil, permits the roots to penetrate deeper, the soil will hold moisture longer and will also permit the surplus rain to penetrate the ground and not stand on the surface. By fall plowing the freezing and thawing help to pulverize and makes the ground in fine condition. Then when spring comes and ground gets dry enough to work without baking, thoroughly work down the soil with disc harrow and drag till in fit condition to plant corn. *Caution.* Don't work your soil too wet, and do not be in a hurry. The last subject of mý paper is the *distances* apart to plant the trees. This admits of some deviation from a specified rule. My observation convinces me that from sixteen to twenty-four feet should bound the extremes with probably twenty feet as about the right disance, the planter should decide upon this according to the fertility of his soil. In strong, rich soil producing a quick, heavy growth, plant farther apart. In thin soil producing a slow growth, plant closer together

Now, having started the ball rolling on the subject of peaches, I leave the many other subjects pertaining to the peach. Such as how to plant, prune, cultivate, varieties to plant, marketing the fruit, to others who will follow. Now my friend, the beginner in planting peaches, listen to what they may say on these various subjects. Pay some attention to the ideas herein advanced. Weigh the evidence carefully and put in practice only those things which appear reasonable and backed up by common sense and leave off the fanciful imaginations of theorist, and we predict success will crown your efforts in growing this fancy and luscious Missouri Peach.

H. W. JENKINS, Boonville, Mo.

PLANTING, PRUNING AND PROTECTION OF THE PEACH, PEAR AND PLUM.

From only four years of experience in fruit growing seems to be a very short time to be drawn upon to explain, to such an experienced and up to date body of people as our State Horticultural Society how to plant, prune and protect our best varieties of fruit, the peach, the pear and plum. But as I have been placed on the program for this article I will give my experience. To plant these choice varieties of fruit a person should have the ground well subsoiled in order to give the roots plenty of space to develop. After the ground has been plowed well, mark the field off both ways with the rows a rod apart; at the crossing of the rows plant your trees by having a place spaded out large enough to be able to get in all of the roots after they have been pruned by cutting back all extra long branches and thinning out those that are too thick.

Prune the peach tree at planting to an eighteen inch straight stub if the tree is not too large. The pair and plum should be cut back one third of the year's growth. The first year's growth, if not more, should be pruned away from two and three year olds, there should be enough pruned to give the trees a well proportioned head, this is done by cutting off all drooping limbs, thining out the center of the top and clipping the ends of the branches to about the same length.

There are only two things to protect a peach orchard against in South Missouri, they are the borer and Jack Frost. The borer can be easily handled by removing the dirt from around the body of the tree to the depth of two or three inches, then you can track the insect by the wax and sawdust on the outside of bark.

The insects should be removed and destroyed twice a year. In the spring in May, and in the fall during September. We can not cope with Jack Frost until we have some thorough system of smudging. The wood smudges are not at all satisfactory.

The pear is to be protected from blight and frost. Blight is a subject concerning which any comments are prohibited by the State society, so I have nothing to say. Smudge to protect from frost.

Plums should be protected from curculio, black-knot and frost. Curculiocan be jared into a sheet, carried off and burned. Black knot should be watched closely and pulled and burned from the time the leaves start in the spring till there is no more sign of it. To protect plums from frost treat them as peaches. C. M. ALDERSON, Koshkonong, Mo.

DISCUSSION ON PEACHES.

W. A. Gardner.—In pruning, Prof. Stringfellow advises the cutting of lateral roots and I have found it a success. The reason is that it will produce roots again and grow well and it is better to have roots start in the soil where they are to grow and so accord with the nature of the soil. The surface roots furnish food and should be near the sunlight and air, also in condition to get food from the soil. The trees bear after three years. They are likely to lose fruit in the third year, so devote three years to shaping, cut the center out to have an open tree. Keep the bud in the right direction and let the branches grow out so as to let sunlight in. I did no pruning back after the third year and for three years now I have had beautiful peaches.

Where the wood was thoroughly seasoned I had best buds and they withstood the frost best. There should be a system in this work. Clean out dead branches, prune when there are no peaches on and trim so as not to know it. Do not cut back far, have the lower part eighteen inches from the ground and cut off three to four feet of the growth. This gives many branches from the old wood, which is fruit producing. Cutting indiscriminately makes a brush heap instead of a tree. On new wood the fruit is not so good color nor strength. To cut every year produces the effect of a young tree which drops its fruit. Do not prune until after frost. In cutting one third you cut off the best bearing part. Keep the roots showing where they grow into the ground on all sides. The borer goes into one of these. A wash of lime, wood ashes and kerosene keeps off the borer.

Gathering, Packing, Marketing.—Use one half bushel baskets lined with excelsior so as not to drop hard into the basket. The California box is good and the commission man says it is better not to wrap the peach. Elbertas stood two weeks in hot Chicago weather. If paper does not hurt pack in four or six basket carriers. It is very bad to send poor peaches onto market. When peaches from Olden glutted the market, poor ones brought five cents a box and those wrapped and packed brought $1.25 per box. Thus fancy peaches pay even on a glutted market, and are always in demand, while the poor peach keeps the market down.

Those who packed poorly thought there was cheating because they didn't get as much as those who sent in good shape. Properly shipped and graded peaches give satisfaction.

J. T. Snodgrass—The great trouble is irregular packing. It should be uniform and uniformly graded. The California box has been sold at poorer rates than others because the commission man did not know they were fancy.

Commission men sell on the track or else represent to their markets what they have. The six basket carrier is the favorite.

Pres. Murray.—One trouble with all fruits is the packing.

L. Erb.—For packing peaches, the six basket and four basket carrier, the California box and one third bushel box are the best. There is a new six basket carrier which holds less but is better and lighter. I do not like the California box, it holds too little.. The favorite in New Orleans is the one third bushel box. Common fruit in baskets, good in one third bushel boxes and best in California box or six basket carriers is my idea of the best arrangement.

The point is the consumers want small packages and these meet the demands of all classes. Small growers should learn to have fruit uniform. In marketing send small amounts by express. But where there is enough for a car the refrigerator is much the best.

Mr. Lang of Memphis—Use the refrigerator car for strawberries, tomatoes, peas, beans, lettuce and cabbage. We load a great many Goodell and C. F. T. cars, but no matter how good the car is, the results can not be good unless we pack and handle properly. We should have several ice stations on the route. Open the doors before using as this lets out the foul air. Have them open for from one half to two hours, no matter how hot the day is, as the car may be musty. Ice before closing, then close one side and the drip box, to drive out the warm air, and it will be cooled enough in fifteen minutes.

In loading leave a space of fifteen inches between the fruit and the top of the car. Fruit begins to degenerate as soon as gathered and forms gas at the top, therefore this space makes a cushion between the gas and the pure air; if it is not so the fruit molds. The boxes should be set end against end and a space left between the piles. Seven or eight cases will reach across the car leaving two inches between the crates so the ventilated air circulates through the fruit. The peach keeps the best of any fruits, but it also shows any imperfection quicker. Mushy peaches are worth nothing, that is speaking for the consumer. Fruit must look attractive on the market and look regular, not the good and knotty together. The peach takes less ice but put in all the ice you can, because the fruit and box are warm. Fruit will carry from here to Buffalo or Philadelphia with one re-icing. Chill your car first and the fruit and you will have no trouble. Vegetables generate heat, so the box must stay filled with ice, this means iceing every three hundred miles and even then with peas, e. g., it is hard to keep them from wilting and turning yellow. Do not reice completely for peaches as you do for other things. One and a half tons are enough to keep the fruit from getting too cold. A California car takes a ton more than a Kansas City car. A manager of peaches in California put in five tons and let it stand on a side track opening and closing the doors so as to cool it gradually and re-iced with two tons; but the fruit had to go into cold storage to keep as it was too cold, and it is not safe to express cold fruit in bulk. To unload a car gradually and hold it for a day or so is better than put all on to the market at once. Fruit sent by express needs no ice car and keeps in a cool place until after the glut is over. Sometimes cars are reshipped to avoid a glut and this can not be done unless a refrigerator car is used. Fruit getting too cold does no harm if the commission man handles it properly. But fruit will spoil at a violent change even if it has been only chilled. The condition depends on the icing of the car, on the stacking of the boxes and on the handling at the end of the journey.

Mr. Anderson—(Memphis, Tennessee).—For packages of peaches, the best specimens in Michigan are put into one third bushel boxes, the others into one half and one bushel baskets. In Georgia they use the six basket carrier. In Kentucky the half bushel basket and in Missouri all of these are used and another wanted. Growers should find what they want and not change so often. All of these are good. The one fifth bushel package is not suitable for long distances. The six basket carrier holds nearly a bushel but we have a new package holding six baskets the same size as the four basket size. For apples the barrels is too large. Bushel boxes are good for customers; made with handles they are better for loading peaches into the wagons than baskets. The price is seven cents apiece bushel baskets are twelve cents.

F. Holsinger.—I choose small trees and get all roots and tops. I took 2½ and 3 feet culls from southern nurseries, cultivated for two years and thinned 300 peaches off one tree, three feet high. I have had five crops continuously in Kansas City.

W. A. Gardner.—The best package and most profitable for fancy apples is the one bushel box.

J. C. Evans.—Every market has its choice package. One-third bushel box is best for Kansas City but I deem it poor taste. Chicago takes anything; Boston wants the twenty pound box and the finest peaches in it. We might do well to educate the people to expect low grades in one-third bushel and the best in 20 pound box.

Gardner.—Interior towns prefer one-fifth bushel baskets. The one-third bushel is not known in Iowa.

Col. Evans.—The one-fifth is good for short distances, put in sound but ripe ones.

G. T. Tippin.—At Van Buren, Ark., a car of strawberries was ordered from Boston. The car was cooled before loading and let stand closed and filled for 24 hours; in this way the berries became firm and the motion did not effect the fruit.

L. A. Goodman.—Three packages are enough. First, fancy; second, fair and third for lower grades.

L. Erb.—The third grade should be in bushel boxes, second in one-third bushel boxes and first in six or four basket carriers.

H. E. Moseley.—Gathering is the important factor. Fruit can not get on to the market right unless it is correctly gathered. The best arrangement for packages is six basket, California or one-third bushel box and one-fifth bushel basket. Put the ripe ones in one-fifth, the next grade selected by the superintendent at packing table go into the third-bushel box and the next grade greener and of two sizes go into carriers. Culls go into half-bushel baskets.

Pack near the trees, put up shade in the orchard. Gather by hand and have tables within 20 to 40 rods of the outer row. Pack securely. A one-half bushel basket will hold four tiers and will bruise if hauled. The basket for gathering is the half-bushel, renail, pack in excelsior and sacking for lining, making a pad three quarters of an inch thick and thus avoid bruising.

Pres. Murray.—Every variety nearly requires a different time for the pickings.

Moseley.—A Family Favorite tree is stripped in two pickings, three-fourths on the first time. Salway takes fourteen days, picked every other day. Elberta requires three pickings, the second takes one-half of them.

In answer to the call for lists of best varieties for market the following were given.

F. H. Speakman (Newton Co.)—

1. Elberta.
2. Heath Cling.
3. Family Favorite.
4. Mixon Cling.

W. A. Gardner (West Plains)—

1. Family Favorite.
2. Elberta.
3. Salway.
4. Mt. Rose.
5. Bonanza.

T. W. Wade (Greene Co.)—

Heath Cling.

H. S. Wayman (Mercer Co.)—
Elberta.
Champion.
Louis Erb (Cedar Gap.)—
Mt. Rose.
Elberta.
Salway,
Heath Cling.
Bonanza.
Picquet's Late.
H. E. Moseley (Olden.)—
Reeve's Favorite.
Family Favorite.
Elberta.
Picquet's Late.
Salway.
J. C. Whitten (Columbia.)—
Family Favorite.
Elberta.
Salway,
C. H. Dutcher (Johnson Co.)—
Elberta.
Champion.
Heath Cling.
G. T. Tippin (Springfield.)—
Champion.
Mt. Rose.
Elberta.
Picquet's Late.
Chinese Cling.
Henrietta.
N. F. Murray (Holt Co)—
Champion.
Elberta.
Family Favorite.
Mixon's Free.
Heath Cling.
F. Holsinger (Kansas.)—
Rivers.
Champion.
Crawford.
Elberta.

Crosby.
Mt. Rose.
Family Favorite.
Reeve's Favorite.
Salway.
Mixon Free.
A. Nelson (Laclede Co.)
Elberta.
Early Crawford.
Salway.
Champion.
Family Favorite.
Old Mixon Free & Cling.
W. H. Loomis (Wright Co.)—
Elberta.
Salway.
J. C. Evans (Howell Co.)—
Mt. Rose.
Reeve's Favorite.
Family Favorite.
Elberta.
Picquet's Late.
Salway.
Bonanza.
G. L. Sessen (West Plains.)—
1. Mt. Rose.
2. Family Favorite.
3. Elberta.
4. Salway.
5. Bonanza.

J. E. Thompson (Johnson.)—
Heath Cling.
Stump of the World.
Elberta.

On a vote of varieties Elberta received 36, Salway 21, Family Favorite 13, Old Mixon Free 4, Reeve's Favorite 5, Champion 6.

G. L. Sessen.—Matthews Beauty has not been fruited in Missouri, but is reported as prolific as Elberta, and ten days later and it carries well.

J. E. Thompon.—June buds on Triumph trees two years old are full of peaches.

The report of the Committee on the Constitutional Amendment was called for.

The Secretary read Article II as it stands:

ART. II. Any person may become a member of this Society upon the payment of one dollar, and membership shall continue upon the payment, of one dollar annually. The payment of ten dollars at any one time shall constitute a person a life member, and honorary members may be elected at any regular meeting of the Society. And any lady may become a member by giving her name to the Secretary.

The committee recommended as follows·

ART. II. Any person may become a member of this Society upon the payment of one dollar, and membership shall continue upon the payment of one dollar annually: Provided, however, that no member shall be allowed to vote on a question of a change of the Constitution, or the election of officers of this Society, until after they have been a member for a period of one year preceding the time of election, except in case of a life member.

The payment of ten dollars at any one time shall constitute a person a life member, and honorary members may be elected at any regular meeting of the Society; and any lady may become a member by giving her name to the Secretary.

The motion was made and seconded that the report be adopted. It was carried-unanimously by a rising vote.

PLUMS FOR PROFIT.

When your Secretary wrote me some days ago, asking that I write a paper on "Plums for Profit," I answered that my experience with plums, so far, was all on the other side of the ledger, and suggested that it would look like presumption on my part to attempt to teach the veteran horticulturists of Missouri how to grow fruit of any kind. But when the program for the June, 1898, meeting came, I found that he had not listened to my suggestion, but had drafted me into the service, and as I have made a rule to do my part when called on as far as I have the ability, I send you my experience in trying to grow "plums for profit."

I have observed for many years that plum trees bear large crops of fruit in this locality whenever given half a chance, and the conclusions drawn from the observations of the efforts of my neighbors to raise plums in small quantities for their own use, are that we have a soil and climate in Harrison county particularly adapted to growing plums of the Domestica type, and I have long believed that, with proper culture and attention, they could be grown here in quantities and of a quality to be profitable.

It was not until two years ago that I felt myself in a position to attempt growing plums in any quantity, and began to inquire of the leading nurserymen of this section about getting trees. I was told by many that it was a mistake to plant such trees, and one man who stands high as a horticulturist told me that I was "a fool to think about planting such trees," that they were absolutely worthless in my section of the country. Had it not been that I knew trees of the varieties he named that were and had for many years been bearing large crops of good fruit here, I would have believed him and quit it at once.

However, I found some who were not so skeptical and who gave me prices in place of advice, and I went ahead and in the spring of 1896 planted about five hundred plum trees. They are planted on very high ground, sloping sharply to the north, with West Big creek on the west less than forty rods, and East Big creek on the east less than eighty rods. The land was originally what we call oak opening land, but the oaks had been cut many years ago, and it had grown up a second growth, which was cleared off the winter before planting. But few trees were lost and these were reset in 1897 and again filled in in 1898, so that now there are five hundred and twenty plum trees. The ground has been kept clean and well cultivated. The trees have made a good growth, and some of them will bear a few plums this year.

I planted very largely of the Prunus Domestica type, the Damson preponderating very largely, with a few of the Japans and a very few of the Americana. I am now satisfied that if a mistake has been made at all in the varieties it is in not planting enough Japans. The reason for planting so few Japan plums (only about thirty), was that at the time they were planted none of the Japan plums, to my knowledge, had borne fruit in this county, but since that some Abundance trees have borne fine fruit at an early age. At this time the Abundance and Burbank are full of fruit, while the Satsuma, Willard and the Yellow Japan have none, although the Satsuma bloomed full.

I planted but few of the Americana—only two or three of a kind and only a few varieties. The reason for planting so few of them was that I do not consider them profitable here, for, while they bear abundantly, they do not command ready sale, the surplus from the scattered trees almost supplying the local demand. They do not seem solid enough to stand long shipments, they are not near so rich or so good when cooked as the Domestica, and the trees do not seem to grow or bear any better.

From observation, I believe that the Damson will be the best Domestica plum here for profit. and for that reason have planted more of them than of any other variety. After them are those of similar habits and that seemingly have Damson blood in them, such as the Richland; also the Lombard, Bradsham and similar strains have all grown and borne well here.

Of the Damsons I have fifty Shropshires—fine growers, and bid fair to bear young; also fifty common Damsons. Then I have one hundred of a variety of the Damson for which no distinct name is known, and never saw them anywhere except in this county. I could not find them in any of the nurseries and had to plant sprouts. They are fine growers, prolific bearers and seem particularly suited to our soil and climate. I believe them to be a seedling that has not yet been described; have been unable to trace them back to their origin, but still hope to succeed in doing so. Some of the trees not over six feet high bloomed this spring. I have Lombards, Brodsham, Spaulding, Shipper's Pride, Moore's Arctic and German prune in quantity, with a few of many other varieties on trial.

The expense in planting and caring for these has been heavy, but I hope and expect in a few years to begin to place some items on the other side of the ledger. I prune these trees somewhat after Hale's rule for pruning the peach, that is, by cutting back in March about half of last year's growth, but shall cut less as the trees get more age.

As to the question of profit, the first thing is to "get your plums;" after that I believe that the remainder of the problem is easy, and have no fear, as the varieties I have planted will bear long shipment, but for all that can grow on my 500 trees there will be market in this county, until others shall begin to grow them in quantity.

I have in my orchard, in addition to plums, 1,200 apple trees, 450 cherries, 200 pears, 150 peaches, 200 grape vines, with a few quince and apricots. Should be pleased to have any person who is interested in fruit growing, and who may be visiting this place or passing through, call and visit my orchard. Harrison county is not yet known as a fruit county, but from the apple and peach orchards planted in the last few years and the care they are getting, you will hear from it before long.

W. H. Skinner, Bethany, Mo.

JAPANESE PLUMS.

Mr. President, Ladies and Gentlemen:

A paper on Japanese Plums was assigned me for this meeting, by our worthy Secretary. Don't feel as though I can do the subject justice. There are no doubt others that have had more experience with Japanese plums than I. Will however give what little I know about them. To begin with, Japanese plums are a great acquisition and have come to stay, but not for a minute do I wish it understood that we should discard our well-tried American and European varieties for those from Japan. For myself I will hold to old standard sorts, such as Wild Goose, Damsons, etc. Have fruited the following Japanese varieties: Abundance, Satsuma, Prunus Simonis or Apricot plum, Kelsey, Burbank, Chabot and Prunus Pissardi or purple leaf plum. Find Abundance the most prolific of all Japan sorts. Have seen as many as two bushel per tree on four-year old trees of my neighbor. The fruit is generally perfect and of very good quality. Satsuma is one of the earliest, but does not succeed well with me, the fruit rotting just before they ripen. Have tried spraying with Bordeaux mixture without satisfactory results.

The Prunus Simoni or Apricot plum is one of the largest plums I ever fruited, having a specimen last year measuring seven and one half (7½) inches in circumference. They are not so prolific as Abundance, but quality of fruit is good, with a decided Apricot flavor, it also being shaped like an Apricot. Skin smooth with tomato-like color.

Chabot has almost proven a failure with me. They will bloom too early in the spring and get nipped by the late frosts. Will also rot on the tree like Satsuma. Fruit of a medium size, good quality, flesh and juice blood red. Need a warmer climate.

Kelsey is another large plum, but does just moderately well with me. Fruit shaped like a heart, of very good quality and fine color. A few trees should be planted by every one for canning for which it is unexcelled.

Can not say very much for or against Burbank, having fruited it the first time last year. It comes highly recommended.

Prunus Pissardi, or purple leaf plum, with its dark red foliage, blossoms and fruit makes a fine ornamental tree for the lawn, but have never been able to get much fruit from it. It is perfectly hardy.

Japanese plums, as a general thing, need good, rich soil, good cultivation and a great deal of attention from the curculio.

Have tried spraying with London purple, but find the jarring process ahead of spraying.

Everybody plant some of the Japan plums, but, as I stated in the beginning, do not discard our well-tried American and European sorts. Plant your plum trees where your chickens run. Give the old hen a chance, and you will find her one of the best insect destroyers we have. Ashes are also good for plum trees.

P. J. Weber,
Tipton, Mo.

DISCUSSION ON PLUMS.

Prof. Whitten.—Japanese plums are promising. Abundance, Burbank and Wickson are best. They have grown for three years at the station and borne good crops; they do not rot as much as Domestica.

Of American the best are; Minor, Wolf, DeSoto, Wayland, and Wyand, a new promising variety. Golden Beauty needs thinning, but is the best keeper after it is ripe. It is late and so nice for preserves, as the cook can put them up in cool weather. Wayland is splendid, has fine trees and sets its fruits finely.

Of European varieties, Damson and Lombard are best, others are troubled with rot and curculio. Next to these are Spaulding, Hungarian, and German Prunes. Lombard ripens before Green Gage, is a large blue plum of Domestica type. Ogon sets double flowers, but does not have much fruit.

M. Searle.—Japanese make fine growth but bear no fruit.

T. W. Wade.—Burbank bears three years in succession.

H. S. Wayman.—Burbank is a fine fruiter, but mildew-rot is prevalent. They rot before they are ripe. Five acres in plums, one-half Wild Goose, netted $800 last year. There in all 2,000 trees set 8 by 10 feet. Varieties recommended are Weaver, Burbank and Mariana.

Moseley.—Japanese plums have failed in Olden for five years.

Speakman.—Ogon is a wonderful bearer, equal to the Lombard, but of poor quality.

THE CHERRY.

Mr. President, Ladies and Gentlemen of the State Horticultural Society:

The subject assigned to me is one I would rather have had given to some one else more competent than myself. The cherry is a fine, luxuriant fruit tree, with smooth, light-colored bark, and generally of rapid growth. As a pleasant and refreshing dessert fruit the cherry is everywhere highly esteemed. The early season in which it ripens, its juciness, delicacy and richness render it always acceptable. While the large and fleshy varieties are exceedingly sweet and luscious, others which are more tender are fine for pies. The fruit of Early Richmond is excellent when stoned and dried. The larger growing sorts of the black cherries are finest of all fruit trees, and were generally chosen by the farmers in my boyhood days for setting along the roadside. The first cherry tree I can remember of was one my father had set in front of his small village lot in the road. It was a Napolean Bigarreau and never failed to bear fruit.

The custom is more generally practiced on the continent than here. Mr. Loudon, in his Arboretum, says: "The cherry is much used as a roadside tree, more especially in Germany and Switzerland, particularly in the northern part of Germany, where the apple and pear does not thrive. In some countries the road passes for many miles together through an aveenue of cherry trees. In Moravia the road from Brum to Olmutz passes through such an avenue, extending upwards of sixty miles in length. We traveled for several days through almost one continuous avenue of cherry trees from Strasburg, by a circuitous route, to Munich."

These avenues in Germany are planted by the desire of the respective governments, not only for shading the traveler, but in order that the poor may obtain refreshment on his journey. All persons are allowed to partake of the cherries on condition of not injuring the trees, but the main crops of cherries, when grown and ripe, are gathered by the respective proprietors of the land on which they are grown, and when they are anxious to preserve the fruit of any particular tree, it is, as it were, tabooed; that is, a wisp of straw is tied in a conspicuous part of one of the branches. Any one who has traveled on the continent in fruit season must have observed the respect to the appropriating marks, and there is something highly gratifying in this, and the human feeling displayed by the princes of the different countries in causing the trees to be planted. It would, indeed, be lamentable if kind treatment did not produce a corresponding return.

Well can I remember in my boyhood days of picking and eating the fruit of the black, heart-shaped cherries, which always grew vigorous and formed such fine spreading heads, 40 to 50 feet high; they were all budded on the Mazzard seedlings, but those of the acid or red cherry, of slower growth, are budded on Mahaleb stock, which makes our dwarf trees, and which seem to be more hardy and suited to our rich prairie lands of the West.

The cherry will grow on any soil, but does best on gravelly loam. If planted on the soil where the subsoil is clay, it should be pulverized deep. When forced to grow in wet places, or where the tree roots are constantly damp, it is short lived. Neither is it best to have them make too luxuriant growth, as in our rich prairie soil the wood becomes so gross as to bear little or no fruit and split open in the trunk and die.

Twenty-nine years ago, when I came to my prairie home, among the trees I brought with me were some fine, two-year-old cherry trees, budded on Mazzard stock, two trees of each variety, among them Black Tartarian, Black Eagle, Elton, Yellow Spanish, Cleveland, Napoleon and Gov.

Wood; they were set in new prairie soil, just broken the previous summer. Every tree lived, and with what pleasure did I watch them grow for six years, expecting to pick a nice lot of fruit some day, but they all split open and died. Since that time I have set out the slower growing varieties, budded on Mahaleb stock. Some of the trees were set a little too deep and are quite large. In my orchard of 200 trees I have confined myself to two varieties: Eary Richmond for early, and English Morello for late. I have my trees headed low, as the wind does not blow them over so, and lower branches protect the bodies from the hot sun in summer; then the fruit is much easier harvested. Most of mine are branched out from six to twenty inches from ground. I cultivate and keep ground clean until trees commence to bear, then mow the clover and put around trees. The standard tree will grow set out like any forest tree, and little or no cultivation, if mulched with straw. I only prune by cutting out dead limbs and crossing branches. The Bigarreau and heart cherries have been a failure with me, while all the Duke and Morello class of cherries have done finely; among these are Olivet, Dyehouse, Large Montmorency, Louis Phillip, Early Richmond and English Morello.

E. A. SYLVESTER, Osborn, Mo.

DISCUSSION ON CHERRIES.

L. A. Goodman.—The two best varieties are Early Richmond and English Morello. I have tried forty or fifty varieties. Have them on Mahaleb root and they do not sprout. They should be on good, high ground. They will not outgrow the stock in thirty years.

F. Holsinger.—Of 4,000 cherries the best two are Dye House and Early Richmond. Large Montmorency is very profitable, a beautiful tree and hardy. English Morello is good. Wragg is the gem of cherries, worth all the rest, bears young and is later. It never failed in eighteen years in Iowa. Large Montmorency and Wragg give the most money. Bud on Mahaleb and plant at a distance of 16 by 18 feet. They grow large and come together.

A. Nelson.—The Yellow Spanish is fine in company and hardy. It needs good ground and care. A Morello tree next to it fruited when otherwise it dropped its fruit.

Pres. Murray.—Sweet cherries are not a success. The Yellow Spanish was brought from Virginia. The record from one tree is that the fruit sold for $900.

J. C. Evans.—Mr. President, I move that Mr. W. H. Barnes, Secretary of the Kansas State Horticultural Society, and Mr. Frank Holsinger, Treasurer of the same, be made honorary members.

This motion was seconded and carried unanimously.

W. H. Barnes.—I am pleased to meet with Missouri Horticulturists, I always enjoy it and learn a good deal. I thank you for the honor you have conferred upon this office and I shall be with you as often as possible. Kansas has made and is making much progress. Our good quarters at the State House help us. We invite you all to our home.

F. Holsinger.—I have imagined for twenty-five years that I was a member of this Society. Missouri got her inspiration and fruit from Kansas. It is one of the pleasures of my life to be associated with this Missouri organization. I have seen its small beginnings and was one of eight to represent it at its new birth, with five from the Missouri Valley Society which has done more than any other west of the Mississippi and is the parent of the Missouri and Arkansas organizations. Horticulture is the grandest, noblest profession of all. The State owes the Society for having interested people all around. I am proud to be a member and thank you for it.

Secretary Goodman.—I have letters from Geo. H. Van Houten, of Iowa, H. M. Dunlap, of Illinois, and T. T. Lyon, of Michigan, bearing good wishes and greeting to us here. Also greetings from Arkansas and Bentonville, Arkansas, societies.

COMMITTEE ON OBITUARY.

Mrs. Rebecca C. Moyer died at her home in Wright County, Missouri, March 7, 1898. She joined the Missouri State Horticultural Society at the summer meeting of 1896, at Willow Springs, Missouri, after which, until her death she was an active and valuable member. She was a leading member of her local horticultural society at Mountain Grove. In her death the Society lost a useful, intelligent and amiable member.

WALTER H. LOOMIS,
Member of Committee on Obituary.

RESOLUTIONS OF RESPECT.

Whereas, It has pleased our Heavenly Father to remove from our midst on March 7, 1898, Rebecca C. Moyer, an earnest and useful member of Mountain Grove Horticutural Society, and out of appreciation ot her usefulness, and respect to her memory it is fitting that we place on record resolutions concerning her services in our society and merits as a woman, therefore be it

Resolved, That by her death the Mountain Grove Horticultural Society has lost an active, zealous and much respected member; one who was devoted to the welfare of her family, and whose virtues endeared her not only to her family, but to all with whom she became acquainted.

Resolved, That the Society extend to the bereaved family of the deceased their heartfelt sympathy.

Resolved, That a copy of these resolutions be spread on the minutes of the Society and a copy be published in the Society's paper.

MRS. C. C. KEY,
MRS. C. B. BROOKER,
WALTER H. LOOMIS,
Committee.
—From *The Eagle*, Mt. Grove.

SWEET POTATO CULTURE.

The first thing is to get the plants, and as a great many sprout their own plants, here is one of the most important parts of my paper. It may seem a little out of the common, to most of you, but is true, as I give it from experience, and not from theory.

My plan is this: I make my hot-bed of coarse manure, such as we get at a livery stable, I place it in a pile, leaving it a few days to heat, then sometimes, fork over the second time in a heap, but *usually* into hot-bed at once. I throw it in a pile all above ground, and then spread and shape it out as I desire, generally about six feet wide, and as long as desired. Then I stake fence boards (about six or eight inches from top edge) and fill almost full of good dirt. I also cover the sides of the bed with six or eight inches of soil. After two or three days the bed is warm enough for the potatoes, and in our climate, the second week in April is early enough to bed them.

And now comes the part that I consider a very valuable secret—the key to success. I spread the potatoes on the bed (about one-half an inch apart) on *top* of the dirt, then cover them only about one-half of their depth, with loose, rich earth. I leave them that way for four or five days, with potatoes in full sight, letting them take sun, dew and even rain unless it frosts, (of course you cover with cloth or blanket at night, but remove in day-time). After they begin to show signs of sprouting, cover them just enough to hide them, *and no more*. Then when you see sprouts coming through cover again, about two inches, with very light, rich, sandy soil. You will never have a rotten potato if you follow these directions.

Sprouts will not come quite so quick, as some sprout them, but they will be more hardy and better rooted, and not be checked so much in transplanting.

Plants should never be set out in this climate before the 1st to 15th of May, and they will grow better if set out in warm weather, even if it is dry, than to set out in wet, cool weather.

VARIETIES.

Early Golden (Yellow Burmuda) and Southern Queen, are mostly grown, as they mature early and are suited to a great variety of soils.

The Red and Yellow Spanish are moderately productive, and very good for a large potato. The Red and Yellow Nansemond is superseded mostly with the Jersey Yellow, which, without much question, is the finest eating potato of any sort we grow, but in some soils it is not productive. I have thoroughly tried the new vineless sorts and find them usually productive and of fine quality, a good sort to plant in gardens and places where the large vines of other sorts are in the way.

MANNER OF PLANTING.

I prefer growing in ridges. I usually cultivate, by scraping down, first weeding, then after that drawing dirt up and loosening at the same time. They should be cultivated very frequently until the vines cover the ground so as to make it unnecessary.

I usually dig after the first frost, and if the weather will admit of it, I leave them on the ground, not in piles, but spread out one in a place, to take a seasoning by taking sunshine, dew or rain for one or two days, then gather up, on a clear afternoon, and put in barrels. In placing them in a barrel, place a layer of potatoes, and a layer of newspaper alternately until full. Then cover with a screen wire and set in an upper room where they will not freeze and they will keep very easily all winter.

The manufacturers of the so-called Mineral Wool recommend that in layers to keep sweet potatoes above everything else. I have never tried it but intend to try it this winter.

In conclusion I will say, the ripening up of potatoes in the fall after they are dug, by letting them take the weather for a day or two, is a great factor to success in keeping them, and often keeping all winter.

There is a kind of fungus that gathers in them that has a tendency to make them rot in the hot-bed, but this is completely destroyed by exposing them for a few days to the weather, before covering them with dirt.

M. L. BONHAM, Clinton, Mo.

MOYER'S FRUIT EVAPORATOR.

BILL OF LUMBER FOR DRY-HOUSE.

4 pcs. 2x4, 10 feet long.
Flooring, 150 feet.
1x1 strips, for trays, 400 feet, lineal measure.
1x2, 47 feet, lineal measure.
1x4, for tray rest in center, 47 feet, lineal measure.

HOW TO BUILD AND OPERATE.

For the house or box part take 4 pieces of 2x4 56 inches long, and 4 pieces 2x4 37½ inches long; nail together with the short pieces on the inside, lapping the long ones on the ends of the shorter—thus making a frame 52x37½ on inside. This makes the sills and plates. Close 3 sides of this with matched flooring, up and down, 7 feet high; now you have a box 7 feet high, 52x37½ inches. Leave the one side open to be closed with 4 doors similar to double stable doors, and in the exact center of this door space nail a 1x2 inch piece up and down to nail tray rest to. This will give 2 rows of trays.

Put comb roof on with the flooring, leaving a vent open at comb 2 inches the entire length of box. Make a V trough, which turn upside down with 1 inch blocks under the corners; this gives ventilation and also keeps out rain; also make 2 6-inch holes below to be opened or closed as needed; this admits cold air and drives the hot air up, causing complete draft. When the evaporator is full of fruit, the holes below should be open full size, except at night when fruit is nearly dried they could be closed, or partly so, which is done by tacking a small piece of board over hole, which can be pushed to one side and a nail or screw hold it in place. For the trays to rest on, take a piece 1x4 37½ inches long, nail a 2-inch piece same length in center of this on top; this gives 1 inch on each side for rabbit; this is for center, and the rabbit rest is nailed to it through the 1x2 inch in front and through the siding on rear side. For the outside rabbit 1 piece 1x1 inch 37½ long; this nailed to the end of box forms rabbit for the trays to rest on. As many of these tray rests can be made as needed to fill the box nearly to top of doors. Place the first ones 12 inches from bottom of box, and continue up, placing them 3½ inches apart. The trays are made of 1x1 inch strips for the frame part and are 2x3 feet square; bottom is made of plastering lath sawed in two, and also cut in two lengthwise, as they are too wide; nail these to bottom of frame, three-sixteenths of an inch apart. When used for berries or sweet corn, tack cheese cloth stretched tightly over the lath. There should be 4 doors in order to have as small a space open as possible in attending to the fruit; these are hung by light hinges to outside and fastened by a wooden button screwed to center upright. The lumber can all be bought at planer ready for use cheaper than it can be cut by hand.

For the furnace, build a box of brick or stone as large on the inside as the house, letting the most of the wall extend on the outside in order to have all the space possible inside for heating. Build into this wall at the bottom and ends, a piece of heavy stack or sheet iron; any old smokestack will do, but must be at least 1 foot in diameter; if smokestack is used, split it and spread as much as possible to have large enough place for fire and all the heating surface possible. This open edge of iron must be well plastered down with mortar, or brick and mortar, that no smoke may get inside. Let it extend just through the wall to a flue built at the end on the outside of brick or stone as high or a little higher than the wall; then a common 6-inch stovepipe set on to run as high as the evaporator will do. A damper in pipe is an advantage to check draft and control heat, and pipe should be at least 1 foot from evaporator.

The mouth of furnace should be at same end as the ventilator holes in the evaporator, and can be closed by a piece of sheet iron with a small draft underneath, the same as a stove door.

Set your box evaporator on this wall and mud or plaster it down tight. In using always have your house well heated before putting in fruit. The top of wall must be fully 1 foot above top of iron; this will make 2 feet space from iron to first tray. In putting the trays in, shove the first one clear back, let second be flush in front, the third clear back again—placing them the same in both sides; this sends the heated air directly over each tray to the top.

EDWARD MOYER, Mt. Grove, Mo.

CHEAP FRUIT DRIER.

The secretary has asked me to give a description of my cheap fruit drier. I have used several different kinds, but for cheapness and rapid work the kiln drier leads any I have tried, and it makes a very fair article, but for fancy stock the American is the best.

A kiln can be put very cheaply. Mine is 20x24 feet, 16 feet high, boxed on the outside and lathed and plastered inside. I have one lined inside with asbestos felt—like it better than plaster. The furnace is manufactured in Sodus, N. Y., weighs about 1,500 pounds, costs $55, has double pipe. The furnace room is ten feet high. The pipe that runs around is about seven feet from ground. The floor is made of strips one inch wide on top and half inch on bottom. The spaces between them are one-eighth or three-sixteenths of an inch. The joists need to be not more than a foot apart. The pipes run around the room and meet in center, connecting with a perpendicular pipe. The pipe should be nine or ten inches, and the perpendicular one, twelve inches. The ventilation in the center of the roof should be four feet square and ten feet high, and the pipe should go up through it. The prepared apples are placed on the floor from five to six inches thick. We put on 150 bushels at a time; they will dry in about eighteen to twenty-two hours. They should be turned once every hour after the first two or three hours. Commencing on one side with a scoop shovel, open a space along the side, then turn back into the space back and forth across the room, then level down even with a rake. When you see some places drying faster than others, exchange the dryer fruit with some part that is greener.

Keep the heat above the fruit about 150 degrees F. The cold air doors on a still day should be left about wide open. If the wind should blow hard from one side, the door on that side should be nearly closed and the other open. There is more danger of too little cold air than too much. If you have a side hill or a part basement, it is much easier to put fruit in. I have the working-room adjoining, but I doubt it being the best plan, as in case of fire you loose all your machinery, which would take two weeks or more to replace; whereas, if the work-room is separate, a new dry-room could be put up in three or four days, and you are ready for work again.

J. B. Durand, Prairie City.

SEVENTH SESSION.

Thursday Evening.

The program opened with music by the band.

MARKET AND DISTRIBUTION.

Next in importance to raising fruit is to dispose of it so that it will pay a profit to the grower. In former years, when there was not so much fruit grown, there was less danger of overstocking the leading markets and returns were, in most cases, fairly satisfactory. But now when we have many large commercial orchards in every fruit growing state of this country it is only by the most judicious management in marketing and distributing our fruit that we can expect to make the business pay. I have often heard it stated that the demand is increasing more rapidly than the supply, but I doubt the correctness of this statement. Any demand that is caused by prices so low that the producer gets less than the cost of production is unhealthy and can not therefore be called a legitimate demand. I know from personal experience that whenever the retail price on grapes goes down to 10 cents per basket in all the leading markets the demand increases, and it is so with peaches when they go down to 50 cents per bushel, and apples when they sell for $1 per barrel, but where, I ask, does the grower come in after paying for picking, packing, freight, commission, etc.?

It costs money to take care of orchards, as I know from personal experience, and the lot of the average fruit grower is not so rosy as some of our optimistic country philosophers would make it out, and unless we make a persistent effort to market and distribute our fruit properly we might as well be raising corn and cotton or go fishing.

In these modern times, nothing of any consequence can be accomplished without organization and co-operation, and in my humble judgment the wisest thing the fruit growers of Missouri can do is to devise ways and means of working together in the distribution of their fruit, just like this society is working for the common good of all. And this refers more particularly to the great mass of small growers as the large ones are better able to take care of themselves. Every county where fruit is raised extensively should have some sort of an organization, with a competent secretary, whose business it should be to look up markets, not only in the large cities, but also in the good size towns of the country, so that each market may get a reasonable quantity of fruit for each day's demand, and thus overstocking and consequent ruinous prices be avoided. It should also be the duty of the secretary to look up the character and standing of the commission merchants in each place. In cities to which large and regular shipments can be made it might be well to have a representative directly from the growers located to look after their interests.

No commission merchant who means to do the fair thing will object to this, and those who are not fair need watching. The secretary should be required to see to it that all fruit is honestly and as near as possible uniformly packed, for if there is any one thing more than another that has a tendency to demoralize prices it is to flood markets with trashy, poorly packed fruit. The secretary should also put himself in communication with the transportation lines and obtain the lowest possible fixed rates so that exhorbitant charges will not eat up the profits. The Railroads, Express Co's. and the Refrigerator lines are all interested in the success of the fruit business and if it is properly brought to their notice that it is the best policy for them to make low and reasonable rates they will do so. I have often figured with the shrewd, but genial Col. Agee, Supt. of the Southern Express Co., on rates and when I convinced him that $1.50 per hundred on peaches to certain points was too high and 75 cents per hundred about right he would generally meet me about one-half way and often better. Many of our traffic managers still labor under the delusion that fruits are luxuries and can stand fancy rates. We must tell them that apples and peaches have become staple articles of consumption like potatoes, meat and flour and should carry very near, if not quite, the same rate of charges.

Now as to the matter of compensation for services rendered by this secretary. I am opposed to the practice of having the commission merchant rebate him 3 per cent of his commission, because the very minute he accepts his pay in this way he becomes the commission merchant's agent as much as the grower's, and in the end the grower has to pay the bill anyhow.

Mr. President I am talking to this society in confidence on this subject as a fruit grower of Missouri and not as a commission merchant of Tennessee.

It is far better to pay the secretary a salary during the season or a certain amount per package and let all growers benefitted by his services contribute. I also suggest that every grower do his own shipping and have returns made to himself direct. When expedient to ship in car lots, several can club together and have the returns made either separately or to one as they may agree among themselves, and I may add it will do no harm for one of the shippers to go with the shipment. In that case if the commission merchant selected does not suit he can turn the shipment over to some one else or divide it out among several, or if the market should be over stocked he can take it to some other city that may be bare of fruit. It may be proper to state in this connection that the reputable commission merchants are not your enemies, but your friends and it hurts their feelings as much to see your fruit sacrificed as it does your pocketbooks. This class of commission merchants would be glad to cooperate with the growers in preventing overstocking markets.

After some experience as a fruit grower and *more* experience as a commission merchant I have finally come to the conclusion that the best way to dispose of your fruit is to sell it and not consign it, but as this is not practical with peaches and berries you must do the best you can along the lines I have suggested. With apples however it is different and my advice is sell them every time. In the long run you will do far better than by shipping them on commission. Pack your apples honestly in number 1 full size barrels and put your brand on them and you will find that some of the very best men that tell you they only handle on commission will come to you and buy them for more money than you will ever get if you ship them on commission. In this connection it may not be out of place to mention that the K. C. F. S. & M. Railroad—on which so many of our orchards are located—from its president and traffic manager down, has always shown a liberal spirit towards the fruit growers whenever their wants were made known. The rates on apples are quite reasonable and I feel satisfied that a request for a fair rate on peaches and other small fruits will be favorably considered.

The officials of this road are all nice men and I "honestly" believe if it were not for the interstate commerce law, every one of you assembled here to-night would have an annual pass in your pockets.

I understand that on to-morrow through the kindness of this same road you will visit a number of the largest fruit farms in Missouri and I assure you that Mrs. Moore and I feel slighted because you will not come to see us, for while we may not be able to show you as large an orchard as some that you will see we can beat them all to hollow when it comes to scenery and rocks and fine spring water and buttermilk.

I believe it was the immortal "Shakespeare or some other poet" after quenching his thirst at our famous "town spring" on a hot summer day who said regarding the spot where I raise apples and peaches and where Mrs. Moore will be glad to see you any of you:

There is a place called Cedar Gap,
  On top of Ozark Mountain—
Where in old mother Nature's lap,
  There lies concealed a fountain.

For those who are in search of health,
  To drink it's waters pure and fine—
Be they poor or cursed with wealth,
  Is equal to the best of wine.

Indeed it may be said with truth—
  And the theory is very sound—
The secret of restoring youth,
  Is only in these waters found.

When therefore in the summer time,
  You don't know where to go—
Choose Cedar Gap to make your rhyme,
  And don't reply by saying no;

LOUIS ERB, Cedar Gap.

Violin Solo by Miss Mary Hammon, Plattsburg, Mo.

AMERICAN HOMES.

We are nearing the close of the nineteenth century and such advances have been made that were we to be summarily transposed to the plain homes of a hundred years ago a housekeeper would be at a loss how to go about the most ordinary duty. Ex-President Bartlett, of Dartmouth College, at his eightieth anniversary celebration, said: "The changes in the transition from my earlier days until now are almost like the passage to another planet—changes in the art of war and the arts of peace, and in the whole comfort, convenience and healthfulness of living and work, in sanitary precautions and in the relief of the sick and suffering. For a single example I have seen the first surgeon of the country chip away with his chisel and mallet at the the necrosis of the tibia by the half hour with nothing to deaden the pain or prevent the suppuration, till one by one we crept into the open air from very faintness. My memory goes back to the flint-lock gun and the smooth-bore cannon, to the sickle and the scythe, to the fire-place and the universal wood fire and the tinder box, for I saw the light a dozen years before the first friction match emitted light. I heard the hum of the spinning wheel and saw the shuttle fly back and forth in the hand loom." This is the summary of a life time and since that birthday the X-rays have been added to the list of discoveries. As each new discovery throws open the door to new fields of investigation and thus accelerates the speed of civilization, we almost catch our breath when we fancy what may come into the life of the infant of to-day. And what has this progress done for the mothers of America—the home makers? It has banished to the ancient attics the means and methods of ancient toil—thrown wide the doors of higher education and really pushed her in whether she would or not, for the man or woman who can not keep pace with it all must perforce be cast a flying obstacle from the track. Where there was poverty there is wealth, but where there were busy hands and heads there are still, if possible, busier hands and heads, but her work is changed. She has been swept with irresistible force into the broader channels of study, philanthrophy and the elevation of humanity, Thus is evolved the 'new woman' of to-day. She will never return to the spinning wheel again, nor would the most cynical man desire her to do so and himself accept the corresponding place filled by man at that time. Is she masculine that she accept the pleasures and benefits of the time? Is he feminine that he prefers the Pullman car to the old stage coach? It proves nothing. There have ever been foolish women and men since Eve ate the apple and Adam went and told.

The system of co-education, which is a national honor, well fits her for co-labor in the great work marked out for men and women by the nineteenth century, namely, the elevation of the masses. Even our war bears the stamp of the times, 'tis a war for humanity—for never before the present day has the world known such a thing as personal service. Five hundred years ago the Franciscan Monk gave something of the kind and then not crystalized into the working order as now exists in large cities, where the slums form a menace to society. These earnest workers distribute food and clothes. Medical advisers and nurses, formers of clubs for boys and girls, inventors of amusement, leaders of mothers' clubs and other orders, in fact teachers of Christianity and humanity, must never cease from pulling, hauling and lifting the great mass that seem always trying to slip down again. Through the mothers' club they make the effort to establish American homes on the hearth of these new comers who will soon be Americans—for Americanism has no color line and no national line one might say. Thus with a clearer head and a stronger hand has the new woman given her energies to domestic problems and home making, until never in the history of the country have children been able to grow up in such an atmosphere of love, knowledge and culture as now.

I one day passed through Cat Alley, in Edinburgh, Scotland—it is a narrow street leading from the main streets toward their beautiful castle—the home scenes there burned a place in my memory time can never efface. The mothers helpless with drink, while wasted infants wailed in the care of wizen faced children, groups of whom fought in the street or scuttled into dark corners apparently bent on escaping the loud blows and curses of wretched looking creatures whose every attribute of womanhood and manhood seemed lost. We occasionally met a half clad child bearing home in a tin pail the Scotch whiskey—that latent demon that seemed to rule the alley. And these were homes!

In our American homes the children's books alone form a strong factor in character building; and in all intelligent households some knowledge of physiology and hygiene exists making absurd the practice of trained men of yore.

Somebody has looked up the medical treatment of George Washington in his last illness. It appears he had taken a severe cold and sent for the physicians. In the meantime his overseer took one half pint of blood. After the arrival of the three physicians three more copious bleedings followed, in the last of which a quart of blood was taken, one of the physicians objected to such treatment, which showed the dawn of better days. Besides this wholesale bleeding the patient was dosed with calomel, tartaric emetic, and scarified with blisters and poultices.

What wonder that our honored president's last words were, "Let me die in peace.

On newspaper authority, I learned that Spanish money was once in constant circulation in the United States—that after the civil war it disappeared, no one knew where. Of these pieces of money one, the smallest, was called a picayune, from which, doubtlessly, sprang the term applied frequently to a colored baby.

A number of years ago a certain paper offered a prize to the best definition ot the word "Home."

These were the customary ones: "The place where mother is," "The cradle of the world," etc., etc. Finally one man stated, "It was the place where a man could be as disagreeable as he felt." This is certainly not the note of the typical American home, but it is borne in upon us that the constant business pressure, and the hustle that is in our very atmosphere, especially of the very large cities, is the very condition that threatens the peace of the home. Surely every one should carry wrapped in a snug corner of the heart a memory of home as the sweetest place on earth.

We are supposed to have in America three classes of people variously defined, but our national strength lies in the second class, that vast multitude who hath neither poverty nor riches to sap its strength with ills, or enfeeble itself with luxury.

From it come our best citizens, our statesmen and our heroes.

The discipline of children of these homes to make self-reliant, self-controlling men and women, is the problem of the day. Indulgence makes neither. The popular idea abroad seems to be that the American system is a species of heathen worship; that we cast ourselves down before the idols of childhood, and are ruthlessly run over and cut to pieces. We must confess there are some grounds for the belief.

I called on a lady once and was met in the hall by a flying Japanese fancy costume, which was tossed down from above by the small son. The mother explained that he was rummaging, and would have all those suits tried on in spite of her protests. The morning had been devoted to it. I hastened to depart. Three more suits soon awaited her unwilling attention.

But oh! discipline! What crimes have been committed in thy name? The old maxim of "Spare the rod and spoil the child," has caused more lies to be told than one can estimate, and is, in a measure, responsible for the perfectly silly and lazy one of indulgence adopted in later years. Wisdom and better judgment in such matters are struggling to the front. The old time civility does not prevail. In my mother's childhood every girl must courtesy and the boy must lift his hat. Emerson says, "Give a boy address, and you give him the mastery of palaces and fortune where ever he goes.'' A gentleman or a man of the world does not boast of personal prowess, or brag of his millions.

The youth abroad show a greater deference for white hair, and the bright American girl traveling there quickly perceives the disapproval the pert air toward her seniors deserves, and to be popular trims her sails accordingly. When we are past the stage of a new country, and learn that such smartness is the mark of frontier life, politeness and deference to seniors will be popular. Bryce says of the institutions of the United States: '' They are of a new type—they represent an experiment of the rule of the multitude unprecedently vast, the results of which are of the greatest importance. They are more than an experiment, for they are beieved to disclose the type of institutions toward which, as by a law of fate, the rest of the civilized humanity are forced to move, some with swifter others with slower, but all with unresisting feet..''

The wise support of these institutions is the work assigned for these rolicking boys and girls. I say girls, for this keen observer further adds, '' In no other country is so much that is good and ennobling in the government due to women.''

The exuberance of youth, this plus energy, is the human steam guided into proper channels, which must be utilized.

Emerson says, '' Until the other day steam was the devil we dreaded. Every pot had a hole in its cover to let off the energy, lest he lift pot and roof and carry the house away. But Watt & Fulton bethought themselves that power was not of devil, but of God; that it must be used and not wasted, if he had such strength it was the workmen they were in search of, if he could be made to chain and cast out other evils; and it has not fared otherwise with higher steam. The opinion of the multitude was the terror of the world. They tried amusing them on a great scale, but as at Rome, the Barbarians swept them away. They tried piling it over with a strata of society. A layer of soldiers, above that a layer of lords and a king on top. They used clamps and bolts and castles, garrison and police, and the upheaval was tremendous; it shook the world to its center, but the Fultons and Watts of politics, believing in unity, saw it was a power, and by satisfying it (as justice satisfies everybody) through a different disposition of society, grouping it on a level instead of piling it into mountains, they have contrived to make this terror the most harmless and energetic form of government. We learn in '' The Song of Life,'' that all life begins in an egg. That the constituent elements of this beginning of the future statesman, and the next summer's butterfly, are the same. When this egg begins to change with the mystery of life, it is the marshaling of tiny cells that move like trained soldiers, each to his place, governed by an immutable law. Whence came the power that tells these tiny things to form the spinal column and then the brain, and coil up there in that latent power which some day shall sway nature? The law of parentage, heredity, marks the line where they shall stop.

Is it a bird? The middle stage is similar to a human being, but suddenly they switch off from the highway, and stop at bird formation. But if it's man—that highest type of animal life—they go straight to that highest point of development, past the switch that leads to a worm; past the turning point for an animal; past the avenue leading to bird life; to man's life whose limit reaches on and touches the spiritual kingdom, even as the animal sweeps from vegetable in its lowest order to animal, its highest limit.

And we further learn that every power we add to our own lives may be handed down a richer inheritance than gold to our sons and daughters. By that same law so pass on the evil taints, "yea even to the third and fourth generation."

So much has science revealed; but no microscope has shown life or the embryo character. The beginning of life is called a protoplasm—the chemist dares to analyze it. He tells us it is composed of carbon, hydrogen, oxygen and nitrogen. A delusion! The moment he separates it thus the life is gone. It is no longer a protoplasm. And who can foretell the character of the sleeping infant, which some one shall fashion for good or evil. What is character but the face? The soul turns toward the world. That alone remains after the spirit has fled to the God who gave it, to make us revere the memory of women like Miss Willard. Character is what places Miss Barton at the head of the Red Cross Society. Character placed Gladstone at the head of a great nation. Go back to their homes and find the character-forming influence that started them on their career.

It is a childs' birthright to be well born. A dissipation of to-day may bring untold sorrow to some one, which in the swiftly moving web of God's making, He will surely see and trace to the criminal; for this body which might have been strong is enfeebled. And what call is there for the feeble frame and weak mind in this world? It is the strong nerve and clear brain the country calls for. It is the rich, pure arterial blood that holds up the stars and stripes.

To be sure capabilities are gifts dame nature has not evenly distributed, but each is capable of something; and to answer for the best development of those gifts is all that will be required of us.

Lowell says:

"No man is born into the world whose work
Is not born with him. There is always work
And tools to work withal, for those who will;
And blessed are the horny hands of toil!
The busy world shoves angrily aside
The man who stands with arms akimbo set,
Until occasion tells him what to do.
And he who waits to have his task marked out
Shall die and leave his errand unfulfilled."

MRS. J. T. SNODGRASS.
West Plains, Mo.

Recitation: "Aunt Sophronia Taber at the Opera," by Miss Emma Evans.

Trio, Piano, Violins: Miss Mary Hammon and Mr. Sam Hammon, Miss Clara McDonald.

SOME OF OUR MISTAKES.

Your honorable secretary, Mr. Goodman, requested our Benton County Horticultural Society to furnish some papers to be read at your June meeting. I was appointed as one of three to prepare a paper without being assigned a subject. Owing to having more work than I could dispose of, I have put this off until the last minute, and I fear you may wish I had delayed it entirely before you hear half of the paper read. It would be a great pleasure to me to be present at your meeting, as I have known for years that you have a good, wide-awake society that is doing untold good and will continue to do so in the future. I now have your five last reports in my library and would not take ten dollars for them if I knew I could not replace them. I refer to them frequently for needed knowledge on horticultural matters.

After drifting around for a subject to write on, I finally made up my mind to write of a few of our mistakes, and, if possible, to suggest in some instances a remedy. Most of us have made some mistakes, at least, and some of us have made many, and as time and space are limited, I shall only mention part of them. So here we go:

First—Many make a great mistake in planting an apple orchard on wet undrained land, and are sure to reap failure in a few years, and, by the way, I wish to state here that what I have to say will be almost, or entirely, in regard to apple orchards. The remedy suggests itself—do not plant on wet land.

Second—Many make a mistake in not thoroughly preparing the soil before planting. It should be plowed deep and thoroughly pulverized, and if we could subsoil it would be much better.

Third—Thousands have made, and are making, the greatest mistake of their lives in buying trees of glib-tongued dealers and traveling agents representing no one but themselves, and selling stock at from five to ten times as much as it would be worth if all right, then fill the order, taking 10 to 15 kinds, according to label, from one variety of trees, the unsuspecting planter carefully planting and caring for trees six to eight years, only to find he has Early Harvest or Red Astrachan where he expected to have Ben Davis or some other good winter variety. Then indeed is there great disappointment and loss of money. Remedy, buy trees of reliable home nurseries.

Fourth—Thousands make a great mistake in being careless about planting, the main object seeming to be how many trees they can plant in a day or given time, in place of seeing how well they can plant what they do plant. They are just as likely to lean a tree north as south, east as west, when, in fact, all trees should be leaned a little to the 2 o'clock sun, with the heaviest part of top on south side. This carelessness results in the death of thousands of trees by sun scald, borers, etc., every year. The prevailing wind being from the south and southwest during the growing season, will have a tendency to lean a tree to the north or northeast, even when planted straight, or even leaning some to the south, and a tree that is planted leaning to the north is sure to be carried over until it is ruined. This mistake is a common one and is made in every state I have ever lived in. I can point out hundreds of orchards that have been ruined as above.

Fifth—Many make the mistake of planting trees to deep. This mistake results in many trees dying with root rot, etc. Many think a deep planted tree will stand better in a storm; this is a mistake. A tree planted deep does not develop nearly so good a system of roots as one planted shallow or at a medium depth; therefore, it does not have the resisting power. I believe a tree should be planted but little, if any, deeper than it grew in the nursery, using care to not make the further mistake of plowing dirt to the trees, piling dirt up about the trees and getting a dead furrow in the center of the row. This is a very common error, and a fatal one, too, in the end. Many, also, make the great mistake of plowing too close to trees with a large turning plow, cutting off and mangling many of the roots, thereby permanently injuring the trees. I use a small one-horse turning plow, plowing two throughs at a time, and the next year plowing just opposite the way I plow this year. In this way I have no back furrows or dead furrows in center of throughs, neither is it piled up against trees.

Sixth—A large portion of us make a mistake in trying to raise a crop of corn or grain in our orchards every year as long as it will grow between the trees. It will do part of the time to raise corn or some hoed crop among trees while young, but we should alternate with cow peas in order to keep up the strength of the soil. Many of our orchards are starved until they cannot produce a good crop of fruit, a fatal mistake.

Seventh—A very common and fatal mistake is in planting too many varieties, many of which are unproductive, and unsalable if they did produce. Having for many years been in the nursery business in Nebraska, I found it hard to keep people from planting everything in the catalogue, and sometimes more. A family orchard can, and should, of course, have more varieties than a commercial orchard. A commercial orchard should not contain more than from five to ten of the best productive and salable varieties. Some, I think, have gone to the other extreme and made a mistake in planting but one variety. I think the time not far distant when we will plant certain varieties interspersed through our orchards to help fertilize other varieties, the same as we do now with strawberries. I am satisfied that some of our finest apples in quality need this fertilizing by some other variety, and when we discover what trees to use for this purpose some of our now unproductive varieties will soon prove to be among our best money makers. But for the present we should plant only a few of the varieties that have proven profitable in the locality where we are to plant.

Eighth—Thousands make a mistake in neglecting their orchards during "off" years. They often say, "Oh! it is no use to spray this year, as I will have no apples, to speak of," forgetting or shoving aside the fact that our insect enemies are multiplying rapidly during this recess we are giving them and getting a good ready to literally salivate us when the fruit year does come. We should, if possible, spray every year, thereby keeping our enemies in check all we can. We should also do what pruning is necessary, cultivate and clean up all we can and try to keep the trees in a vigorous condition, so they will be able to bear the great strain of maturing a large crop of the king of all fruits, the delicious and health-giving apple.

I could go on and enumerate our mistakes in many other things and ways not mentioned, but time and space forbids. If, in these few rambling words, I shall save others from making similar mistakes, and refresh the memory of some that have made them so they will warn their neighbors and others against making such mistakes, thereby resulting in some good done in the noble calling of horticulture, I shall feel well repaid for the time I have given to this paper. With a fervent wish that you may have a pleasant and profitable meeting and that your noble society may continue to grow and diffuse knowledge in future, I subscribe myself as co-laborer with you in the noblest of callings—Horticulture.

I. Henthorn, Bentonville, Ark.

HOME STUDIES IN HORTICULTURE.

During the present day we hear a great deal about educating every man for his profession. There is great impetus toward supplying facilities whereby everyone may fit himself for his particular work. If one applies for a position today he is immediately asked where, and in what manner, he has fitted himself for the work. This is an age of specialties and of skilled labor, when every applicant is expected to present in some form the equivalent of a diploma, showing his fitness for a position sought. Our schools are rapidly equipping professional departments designed to promote especial fitness for the various professions—theology, law, engineering, agriculture and many others.

In view of the fact that man is everywhere realizing the desirability of making his life work an intense study, it seems pertinent to this occasion, that we consider some of the opportunities for home study in horticulture; some of the ways by which the growing horticulturist may reach a better understanding of his art, and a more thorough knowledge of the science underlying his every operation.

I have heard boys and girls say, and I have said myself, that I should like to learn more of science if I only had the opportunity. Schools *are* a most excellent thing, and yet the fortunate fact remains that the opportunity for study and education is not confined alone to our public schools or to the class rooms and laboratories of our colleges and universities. To the boy or girl who is so fortutate as to live upon a farm or to have a piece of ground about the home, the opportunities for becoming acquainted with the mysteries of plant life are almost boundless. Would the youthful horticulturist who is growing vegetables or flowers or fruits like to know more about the mysteries of plant growth? Would he care to step into a modern laboratory and, under the microscope, learn how the plant is built up cell by cell? Would he investigate the growth of the plant—its relation to moisture, heat, light, and food supply, and learn what little is known of how the cold clay of the earth and the invisible gases of the air are transformed into the pretty flower or the delicious strawberry? He who wishes to know more about the development of plants has access to the greatest of all laboratories; one in which the most essential of all equipment is complete —I refer to nature's laboratory—the grounds around you—the great out-of-doors, in which has been developed every living thing known to science, and in which remarkable developments are every day going on, whether we observe them or not. Unfortunately most of us fail to learn many lessons from the year's development of our plants. Nature is an excellent teacher too, if we only look about us for her lessons. She is an accurate teacher and never tells us lies or makes mistakes.

I fear the average boy or girl labors under the impression that to learn anything about plants he must go to school and study botany under the instruction of some one who knows all about the subject. This is an erroneous opinion. To begin with no teacher knows all about this subject, and while he might show you how to find out many interesting things, still the fact remains that a boy in a garden can, in a few years, if he will form the habit of seeing things, learn more about plants—about botany and horiculture than the majority of us ever know.

To learn something about plants we want to see what they do—wha changes take place in them daily. In other words we want to become thoroughly acquainted with them. In order to become better acquainted with our plants we must sharpen up our powers of observation; we must train ourselves to see slight differences. This is necessary to the extent not only that we may be able to distinguish the differences between varieties but that we may be able to recognize the ideal tree or plant of a variety. We should be able to discern the difference between the tree that is in perfect condition and the one that is just ordinarily good, or not quite perfect. Almost anyone can grow pretty good trees, trees that are almost right, but it is another thing to tell when they are just right. The margin between *ordinarily good* and *just right* is often sufficient to make the difference between success and failure in any line of business.

If we look over the list of men who have been the most successful horticulturists—those who have become eminent in the profession—we will find that they are invariably the ones who have been the most analytical in the observation of their plants, and have been able to note and describe accurately their characters. A great many who know the difference between an apple tree and a pear tree can not describe the characters by which they distinguish that difference. I have seen many a boy who was able to distinguish the difference between a cherry tree and a pear tree, at any time of the year, who, upon examining winter twigs cut from these two trees could not tell which was which, though the distinguishing characters were just as plain in the twig as in the whole tree itself.

There are a great many lines of home study, by which the student of horticulture may so train his powers of observation that he may become better acquainted with his plants, their needs and their habits of growth. Reading should be supplemented by practical observations in the field, of the facts written about in our horticultural books and periodicals.

The study of buds and their development throughout the year is a valuable one. The difference between fruit buds and wood buds should be investigated, as well as noting the time of year when these differences become apparent, in the various fruit trees. The habit of flowering, and whether a bud produces a single flower, as in the peach, or a cluster of flowers as in the apple and pear, are interesting and valuable features. Attention should be given to the determination of varieties by the winter characters of their twigs, as seen in the shape and number of the protecting bud scales, the appearance of the leaf scar, etc. Our trees differ much in the character of the branch upon which the fruit is borne. In the peach, fruit is borne upon the long whips of the past year's growth, while in the apple, the fruit appears on short spurs nearer the body of the branch.

Noting the date of flowering of our various fruit trees and ornamentals is a valuable study. The date of the first appearance of rusts, blight or other diseases, has an economic value.

The propagation of plants by seeds, cuttings, layers, etc., is one of the most interesting phases of gardening. Careful note of how seeds get out of the ground, and the development of young seedlings from day to day soon leads to intense interest in plant growth.

These, and other lines of observation which one may himself suggest, lead slowly but surely to a correct understanding of growing plants, and fixes the habit of seeing and thinking about things. While the mere facts learned are valuable in themselves, the mental discipline and ability to observe correctly, that is thus gained, is of infinitely greater value. The boy or girl who will persistently follow out such observations, may acquire a greater knowledge of true science, than he who reads all his life about the observations of others without having observed for himself.

J. C. WHITTEN, Agricultural College, Columbia, Mo.

MR. J. C. EVANS ON THE EFFECT OF THE DROUTH.

No one realizes the magnitude of this subject. I wrote a paper and the more I tried, the bigger it got. I found many things which did I not know and some to change.

More trees were planted in the spring than ever before in one season in Missouri. More trees were killed, or injured to die than were planted last spring. What is the matter with all but pears? All others have surface roots except the pear and so were effected by the drouth. Failure to bloom this spring was one result of the drouth. Results are not all yet developed, but thousands are dead and thousands yet to die.

Music: Piano Solo, Dance Medley, Prof. Miffle.

FINAL RESOLUTIONS.

West Plains, Mo., June 9, 1898.

Mr. President:

We, your committee on final resolutions, beg leave to report as follows:

Resolved. that the thanks of the members of the Missouri State Horticultural Society are due and are hereby tendered to the people of West Plains and vicinity for the very hearty welcome they have given us, and the kind treatment we have received at their hands; likewise the Farmers' and Fruit Growers' Institute of Howell Co., Mo., for their cooperation; also to the ladies for the beautiful decoration of this hall, and to Mr. Stanley for the fine collection of plants, including the night blooming Cereus, which blossomed for the occasion. We thank also the K. P. Band, the mandolin club and others for the splendid music furnished for our benefit. We thank the M. K. & T., the Pittsburg & Gulf, the Kansas City, Ft. Scott & Memphis and the Frisco railroads for reduced rates to and from this meeting and especially do we thank the Kansas City, Ft. Scott & Memphis R. R. people for tendering to us, free of charge, special cars that we may visit some of the fruit farms along the line of their road after the meeting adjourns.

J. C. WHITTEN,
WALTER W. HENRY,
P. P. DOBOZY.

The motion to adopt these was carried unanimously.

Friday, June 10, 1898.

Friday morning at 10 o'clock the members of the State Horticultural Society, visitors and a large number of citizens of West Plains and vicinity boarded the train provided by the Kansas City, Ft. Scott & Memphis R. R. Co. and proceeded to Koshkonong. Along the route many exclamations of delight and wonder were heard of the beautiful Howell Valley, which is now at her best, as the miles of golden grain, now being harvested, waving meadows and thousands of apple, peach and other fruit trees that extend along the line, gave evidence.

Arriving at Koshkonong the party was met by a large number of vehicles and proceeded to the fine peach orchards of Culver Brothers. Their orchards are in a fine, healthy condition, promising a yield this year of probably seven to ten thousand bushels.

After viewing the Culver Brothers' beautiful farm the party proceeded to the 3,000-acre McNair Fruit Farm, when a halt was called at the residence. Refreshments, consisting of lemonade, cigars, etc., being served, Mr. McNair was called on to make a statement regarding this immense orchard. He said he was not a novice in the fruit business when he came to this country, that he has 800 acres in apples in Illinois, and that in July 1893, he came to the wilderness on the Ozarks, seeking a location for an orchard, and settled on the present site. In the year 1893-1894 his company cleared the land and set out 36,000 trees, 20,000 being peach and 16,000 apple trees. At the present time there are 900 acres planted to trees, consisting of 61,000 peach, 20,000 apple and 3,000 pear trees. The ground is now being prepared for 60,000 more peach trees, which they expect to set out this fall and next spring. Mr. McNair says he sold his crop of peaches last year for $36,000, and that after paying the expenses of picking, packing, crating, freight and commissions he had over $19,000 net profits.

In their young apple orchard they have planted 340 acres to cantaloupes, and expect to make a neat little sum from this crop. Also, that it is a good crop to raise in a young orchard, as the cultivation necessary to make the melons is very essential to the growth of the trees.

Mr. McNair expects 20,000 bushels of Elberta peaches this year, and it is hoped his expectations for a good price will be fully realized. In the first block of 20,000 trees planted Mr. McNair guaranteed that there was not a tree missing and only three seedlings.

Mr. McNair then proceeded to pilot the party over a part of his orchard, the time being too short to make an extensive survey. The trees were found in fine condition, and certainly the McNairs have an orchard that they may well be proud of. They are doubling the capacity of their packing sheds and making other extensive improvements in order to better handle the coming crop.

The party then proceeded to Koshkonong and at once repaired to the beautiful grove of native forest trees belonging to Alderson Brothers, adjoining town, where an elegant repast of good things was served and greatly relished by the hungry and thirsty crowd, after their ride through the burning sun. It is only just to say that Koshkonong should be commended for the magnificent generosity tendered her guests.

After dinner an hour was spent in listening to speeches and music by the K. P. band and Mandolin club of West Plains. Col. Hitt, who is one of the fruit growers near town, made the welcoming address, which was responded to by President Murray, C. H. Dutcher, Richard Ramsey, R. A. Radle and others.

The excursionists then boarded the train and were soon on their way to the renowned Olden Fruit Farm, where on arriving they were met with conveyances and, under the care of H. E. Moseley, the efficient foreman of the Olden Fruit Farm, were piloted over this greatest of Missouri orchards. The trees are looking finely, some of the peach trees being loaded with fruit, and the prospect for a bountiful crop of peaches is very good. This farm is in a high state of cultivation and contains forty acres of blackberries, over 100,000 peach trees, 55,000 apple trees, 2,000 pear trees, 2,000 plum and 1,000 cherry trees. They picked and packed the last of this year's crop of cherries while the party was there.

After viewing the farm the party proceeded to investigate the distillery and canning factory, as well as to sample the peaches canned by this company, which were pronounced very good by everyone.

On the second floor of the canning factory dancing was indulged in by some, the mandolin club furnishing the music.

During the afternoon Col. Evans called the society to order and offered the following final resolutions by the committee on resolutions, which were unanimously adopted.

WHEREAS, The officials of the K. C., Ft. S. & M. railroad have made it possible for us to have a most enjoyable day visiting many of the most important fruit farms along the line of the said road in Howell and Oregon counties. Especially did we enjoy the drive about Koshkoning and Olden, and the grand banquet at the former place, for which we are indebted to the people and especially to the ladies of Koshkonong.

THEREFORE, Be it *resolved* that our thanks are due and are hereby tendered for their public spirited generosity, and their manifestation of their appreciation of our work. Also,

Resolved, That a copy of all the final resolutions be forwarded to the general office of the road.

After other matters were all attended to the members and visitors were the guests of Col. Evans for supper, after which social conversation was indulged in and an exhibition of Mr. Paul Evans' trained hunting dogs enlivened the time until the whistle of the train announced the time to bring the pleasant associations to a close, and all departed for their respective homes, feeling that this had been one of the most successful meetings in the history of the society.—*From the Southwest*, Springfield, Missouri.

WINTER MEETING AT COLUMBIA.

WINTER MEETING AT COLUMBIA.

ANNUAL MEETING

Held at Columbia, December 6, 7 and 8, 1898.

FIRST SESSION.

The forty-first annual meeting of the Missouri State Horticultural Society was held December 6, 7 and 8 at Columbia. This was one of the largest, most enjoyable and most profitable meetings ever held in its history. The papers were on practical horticultural topics and were replete with interesting information. The fruit exhibit made this year, when the crop has been reported as a signal failure, makes one ask, What was the display like when an abundant fruit crop was reported? The exhibit of apples, pears, persimmons and canned fruits, also the varieties of nuts, convinced all present that Missouri is the home of the horticulturist. The hall was tastefully decorated with palms and plants from the hot house of the Missouri Agricultural College. The Omaha exhibit of the Agricultural College was on exhibition and was a most creditable display. These fruits were in glass jars.

Horticulturists were present from all parts of our state and from other states, and the financial successes of these men in the fruit business gave a tone of great hopefulness to the entire meeting, verifying the adage that "nothing succeeds like success." A large number of those present were the veteran horticulturists of Missouri; few men of our state societies have been privileged to witness the success of efforts and self-denial as have the members of the Missouri Horticultural Society. Gov. Norman J. Colman, the first president, was in attendance, as was Judge Samuel Miller, Col. J. C. Evans, Hon. N. F. Murray, Secretary L. A. Goodman, A. Nelson, C. C. Bell and others who have long been connected with the Horticultural Society. The members testified their satisfaction of the management and faith in the officers by a unanimous election of the old officials.

The meeting being held at Columbia was the more instructive and enjoyable because of the opportunity given to the members to visit the State University and particularly the Agricultural College and Experiment Station, and to examine the effective work that is there being done by Prof. J. C. Whitten, professor of horticulture.

The members expressed much satisfaction in the character of the work that is being done at the Missouri Agricultural College and Experiment Station under the direction of H. J. Waters, dean and director, who is himself the product of a Missouri farm and a graduate from the college, and who, horticulturists feel, will faithfully champion their interest. Dr. R. H. Jesse. president of the State University has also won the confidence of Missouri horticulturists by the support he has given to this work. Thus the society adjourned with the assurance that with such support the fruit interests of Missouri would advance more rapidly in the future than in the past.—*Colman's Rural World.*

THE MISSOURI STATE HORTICULTURAL MEETING.

The evening session showed at once that all were in prime spirits to make the meeting a success. In fact our meetings are never anything else. At times I feel as if I were getting too old to attend these meetings, but when I get among the brotherhood it makes me feel young again.

Advantage was taken of the morning to examine the exhibition, and here is the result, somewhat lumped; and those who did not attend will have to be satisfied with it, while those present saw for themselves—256 plates of apples, 38 of pears, 14 of quinces, three varieties of chestnuts, three of pecans, eight of persimmons and one variety of walnuts. All the fruits were fair specimens and in fine condition. Most conspicuous among the apples were several plates from Oregon and Washington which showed what can be done in this line on the Pacific coast. One plate exhibited by our good friend, Mr. Gilkerson, of Warrensburg, attracted my attention. The apples were from Hood River, Oregon. Among them was an Esopus Spitzenburgh, the finest specimen I have seen in 40 years. There were 200 jars of fruit preserved in liquor, 15 jars of grapes, a nice collection of ferns, some tropical plants, an araucaria (Chili pine) and one large India rubber tree.

The whole meeting was one that we may be proud of, and the warm welcome we received from the citizens of Columbia and the gracious hospitality tendered us all show that our cause is a good one. In all the discussions there was nothing but harmony. Some thought that our honored ex-president might not take as much interest in the society's work as heretofore during his long presidency, but they were mistaken, for there was no better worker in the whole gang than he. I want to say that I don't believe that there are two other men in Missouri, or in the United States, that have done more for the cause of horticulture than J. C. Evans and L. A. Goodman.

One of the most gratifying events of the meeting was the pleasure of taking Gov. Colman by the hand as he entered the hall. He looks as fresh and vigorous as a school boy, and we, one and all, felt honored by his presence. He was the first president of the society when it was organized more than 40 years ago, and since then has been helping us wherever he could. His paper has been our great advocate in the good cause. It was he who gave us the Division of Pomology when he was Secretary of Agriculture. Another pleasant event was meeting with Mr. Levi Chubbuck, who is associated with Gov. Colman as editor of the *Rural World*. There are but few classes of people who meet each other with a more cordial, fraternal spirit than do our horticulturists. These experiences cheer up an old fellow.

Finally, I must say that the citizens of Columbia certainly, one and all, did the "pretty" for us. The faculty of the University, from the president down, did all they could to make us comfortable and happy. When in our intercourse with the world we meet with such receptions we are reminded of the Scottish bard who, after the hospitality tendered him at a stranger's house in the Highlands, made the following statement:

> "When I'm ferried over the dark river,
> A time that will surely come,
> In Heaven itself, I ask no more
> Than just a Highland welcome."

All the officers of the Society were reelected without a dissenting voice. One of the pleasant features of the meeting was the attendance of representatives from other states. Gentlemen were present from Illinois, Iowa, Michigan, Nebraska and Kansas, also our old and valuable friend, Prof. H. E. Van Deman, now of Virginia, whom I first met so many years ago at Emporia, Kan., and Prof. M. B. Waite, of the U. S. Department of Agriculture. He was at one time our national pomologist, and has lost none of his enthusiasm. He is a noble co-worker in our cause.

There were many very valuable and interesting papers read and the music was grand. A paper by our friend, M. Butterfield, of Lee's Summit, on Alaska was deeply interesting. No doubt it was a surprise to most people to learn that fruit grows in that far north country. To show that the Horticultural spirit is stronger in him than the gain of filthy lucre, I will state that he never once alluded to gold.

SAMUEL MILLER, Bluffton, Mo.

The first session of the forty-first annual meeting was called to order by the President, Tuesday evening, December 6, 1898, in Stone's Hall, Columbia, Mo.

The little Misses Robnett opened the program with a piano duet.

Dr. M. E. Moore, President of Bible College, delivered the opening prayer.

Address of welcome, by Pres. R. H. Jesse, of the State University.

ADDRESS OF WELCOME.

Mr. President, Members of the Missouri State Horticultural Society, Ladies and Gentlemen:—It was my good lot to dine with an Agriculturist in company with a horticulturist, and so good was the dinner and excellent was the company that I came very near not getting here at all. You have here a good many of our people who are glad to welcome you. You are more than welcome to this town. The people of this town feel a great interest in this meeting.

A few years ago California was easily the first state in Horticulture; but last year her fruit products were worth $17,000,000 while those of Missouri were worth $20,000,000. This places her in the front at a single bound, and this proud position we will maintain. Nature has given us the conditions for such a position. The people of the states to the north of us are full of life and vigor; if other things were equal the race might be against us, but their cold climate is against them. In the south they have the canker left by slavery and the well know southern languor to contend with, Missouri is in middle latitude, has a zone in the air, and a climate adapted to fruit growing. Missouri is all right, and will continue to be the foremost state in Horticulture and in many other lines of production.

When the dean of the Agricultural College came here he thought that live stock was the greatest interest of our state; but he has been constrained to admit that Horticulture is to be the greatest interest of the common wealth of Missouri; and we are molding the work of the Agricultural College along this line. You Horticulturalists ought to feel the greatest interest in the University. We have an equipment for teaching Horticulture, the best to be found anywhere in the west. There is but one institution, and one state that can approach us in this respect. That state is New York, and Cornell is the only institution that can successfully compete with that of the State of Missouri.

I looked for several hours for a joke or two to entertain you; but they did not come; and if I should tell you the ones I have repeated so often before the people of Columbia they would stone me. Excuse me, therefore, for making a serious speech. The University needs some things yet. We have not a chair of Botany. We have not had the money to maintain such a chair. When you speak of Botany the minds of some people think of tulips, flowers, ornamentals and herbariums; yet Botany deals with grasses, grains and all kinds of useful plants. We need a building for Horticulture, botany, and entomology. Will the Fortieth General Assembly give us such a building? If this society will endorse and push the application, I believe we can get the building.

The school laws should be revised so as to permit the teaching of Horticulture, Botany, Entomology and shop work in our public schools. Why should a farmer's son spend eight years in learning all sorts of useless things and not one word that will be useful on the farm, in the garden or the house? I do not wish to see the study of grammar, arithmetic, geography, and such things stopped entirely, but I hold that a portion of the time should be given to the farm, the garden, the shop, and the household. The chief obstacle in the way of this change in the work of our schools is to get the teachers trained for the purpose. The University should be prepared to train all the teachers needed for this work. We will take the contract to train fifteen thousand teachers, if you will get the laws passed.

To recount; we need first a chair of Botany; second, a building for Botany, Horticulture and Entomology; third, we need our state school laws changed so as to include Agriculture, Horticulture, shop work and household economy among the subjects taught in our schools; and fourth, we should pass a law to have at least one first class high school in every county, supported partly by local taxation, partly by the county, and partly by the state. I know there are some high schools in the cities of the state, but they are, in a manner, smuggled in. They have no legal status in the state of Missouri. We need such a high school in every county. All these county high schools should teach Botany, Entomology, Horticulture, Agriculture, shop work and household management. If you can help in these four things, till they are accomplished, education in Missouri will be absolutely universal.

I beg your pardon for keeping you waiting, ask your help in the work outlined, thank you for your attention, and again bid you welcome.

R. H. Jesse,
President Missouri State University.

RESPONSE TO WELCOMING ADDRESS.

In attempting to respond to the address of welcome to which we have just listened, we feel at a loss for language adequate to the occasion. As we look over the large audience before us, gathered in this educational center from the best homes of Missouri, and one of the most cultured cities in our State ,and read in the smiling face and beaming eye the hearty approval of the eloquent address by Dr. Jesse, we feel our utter inability to do justice to your enthusiastic welcome. But we are happy that we have in the good old common English an appropriate sentence (and one which we are sorry to say is too often forgotten by the recipients of kind favors) that will answer our purpose to-night, so we, as members of the State Horticultural Society of Missouri, join with our distinguished guests from other states in saying "Thank you."

We meet with you on this occasion to hold the forty-first annual session of the State Horticultural Society of Missouri. In doing so we have neither time nor inclination to review the ups and downs of the forty-one years of our existence—forty-one years of the most wonderful events and most rapid progress in the history of the human race. Has our profession of Horticulture kept up with the march of progress or fallen behind?

I will answer this question by giving you some items of history. In 1800 we had two nurseries in the United States, one in New York and one in Connecticut. In 1850 we had thirty-two, a gain of thirty in fifty years. In 1895 we had 4,510 a gain of 4,478 in forty-five years, with an invested capital of fifty million dollars, employing 50,000 hands.

When the Missouri State Horticultural Society was organized in 1857 the annual income from the sale of fruit (according to Warder) did not exceed $20,000,000, a sum but little if any larger than the present income of our own state. What gave such a wonderful impetus and led to such a marvelous growth in Horticulture? Why should we have gained but thirty nurseries in fifty years prior to 1850 and then in the next forty-five years make the unprecedented gain of 4,478. It was because in the early history of our country we were a nation of Agriculturists. Then a man went to market at the cross road village or county seat to sell the products of his farm or orchard. He met his neighbors with the same kind of produce and as no one wanted to buy the only show left was to exchange beans for pumpkins and squashes for turnips. We had but few cities and no means for the transportation of our perishable products to distant markets. Our mining and manufacturing interests were undeveloped and railroads were yet to come. But with their coming a new era dawned upon our country. Great trunk lines were built in all directions, thus making it possible to settle our broad prairies and develop our hitherto hidden wealth; to bring forth the rich ores from thousands of mines to furnish well paid labor for hundreds of thousands of honest toilers. All this gave our young Republic new life and energy, led up to a higher plane of civilization and gave us a standing among the nations of earth that is the wonder and admiration of the world.

It has given us a home market for the product of our orchards and fruit gardens and rapid transit to the markets of the world. Vast areas of country have been settled with a thrifty people beyond the limit of successful fruit production. This has very much widened our market. Prior to 1890 no great amount of fruit was exported to Europe. That year we sent over 451,000 barrels of American apples as a sample, and as the big hungry cattleman from Missouri at a Chicago hotel, after devouring the tid bits set before him, called out to the waiter, "Your samples are all right, bring on your grub," so Europe, after sampling our apples, has ordered us to send on the grub! And in obedience to their order we have increased our shipments from year to year, till last season we sent 2,936,000 barrels.

While this is very gratifying in a general way, what can we say for our own state? Well, Missouri possesses 20,000,000 acres of farming land, 15,000,000 acres of fruit land, (the best in the world) 12,000,000 acres of coal land, 6,000,000 acres of lead and zinc, 7,000 miles of railroads, 250,000 farms, 40,000,000 fruit trees in orchard. She has the largest cash school fund of any state in the Union, over 3,000,000 population, 35 cities with a population ranging from four thousand to one-half million and over, one of which, St. Joseph, is the richest city per capita in the United States, a University and numerous other institutions of higher education, which are the pride of every Missourian. At the World's fair at Chicago, Missouri took more awards than any other state or foreign country. And in every contest where she has entered the race for Horticultural honors, she has borne off the highest prize. When we consider her vast resources and what has already been achieved, who will venture to place a limit on her future possibilities? With all the Horticultural honors won, who will say that the State Horticultural Society of Missouri has lived and labored in vain or that she has not kept up with the march of progress? and where would Missouri's fame as a fruit producing state have been without her noble work? Where is the man, with forty million orchard trees, an annual income of ten to twenty millions of dollars, and scores of gold and silver medals dazzling before his eyes, who will now say that the money appropriated to aid in this grand work was not a wise and profitable investment upon the part of the State.

But with all this array of magnificent achievements, shall we be content? No, by no means! Fruit growing has now proven to be the safest and most profitable industry in our State, and it is our purpose to rally our forces, renew our efforts and march on to victory. Nor will we be content or deem the victory won till we have seen the wild woodlands of South Missouri converted into comfortable homes, surrounded with orchards, vineyards and berry plantations, the hills and bluffs along the streams of North Missouri largely devoted to commercial orchards, and every farm home provided with an orchard and fruit garden sufficient to supply the family with an abundance of rich, life-giving fruits in their season; not till we shall see all our college and public school grounds beautified with trees and shrubs, and our public highways lined with shade and fruit trees; not till we shall have carried Missouri onward and upward to fill that high position for which nature has so eminently endowed her, the fruit garden of the world and the empire state of this Republic.

For this purpose we cordially invite all students of Horticulture to enlist under our banner. Do you think you could do better, or do you imagine there is a better country than Missouri? If so, then please permit me to give you the evidence of one of your own citizens. Long ago a family in Boone county becoming discontented, concluded to move to Arkansas. Then, after years of struggle in an unhappy section of swamps, chills and fever they concluded to go to Texas. After a long and bloody conflict with centipedes, tarantulas and other marauders, they decided to make another move. So, after loading what they had left into the old covered wagon and hitching up the old mules, they struck out for their new eldorado. After a long and weary journey they struck camp on the barren, sandy, blizzard-stricken plains of "bleeding Kansas," where, after a desperate effort, they found it impossible to hold anything, not even the farm plastered all over three deep with cut-throat mortgages. So once more the persevering pair made another move and this time landed in Iowa, where they found matters somewhat better till a hard winter overtook them. Then almost frozen to death they decided to return to the home of their first love (Boone county) where, after a few years of old time prosperity, the old gentleman died and his ever faithful wife ordered a suitable monument to mark his last resting place. When the contractor had completed the job, the old lady, after looking it over carefully, said: "Look here Mister, you can just take that thing down and home with you!" "Why, what is the matter, my good lady?" "Well I can't have a monument with such a lie as that has on it at my old man's grave!" Lie, my dear woman, what do you mean?" "Why, them thar lines at the base, where it says 'gone home to that better country!' I just tell you right now that my old man and me tried all them other countries and there is no better country than good old Boone county, Missouri!"

And now, laying all jokes aside, I say to you in all candor, there is no better state than Missouri, and no place that offers such golden opportunities for pleasant homes and profitable investments. And in order to make your success doubly certain, strike out boldly, with a purpose in life. You may have subordinate plans, but have one single aim and bend all your energies to reach the goal of your ambition. A sportsman once sent 25 cents for a receipt to prevent his shot gun from scattering and received in reply, "Load with a single shot!" My friends, it was the single solid shot fired from guns by well trained men that brought down the Spanish flag and sent "Old Glory" up; that sank the Spanish fleet and gave freedom to the islands of the sea. Let us, as Horticulturists, organize our forces and march on to newer fields, and with faith in God, home and country, with well trained guns and solid shot we will bear down all opposition and hold the field against all enemies.

In conclusion, we extend a cordial invitation to all you good people to attend the sessions of our meeting, and for your generous welcome, we again thank you. N. F. MURRAY, Oregon, Mo.

Vocal Solo by Ola Turner. For encore Miss Turner sang that sweet old ballad, "My Old Kentucky Home."

THE USE AND CONSTRUCTION OF GREENHOUSES FOR HORTICULTURISTS.

During the past ten or fifteen years, not only has there been a marked change in the methods of building greenhouses, but there has been a great increase in their use. This increase has been quite large in the neighborhood of large cities, but there has been a greater amount of building in the vicinity of the small towns, and even in sections remote from settled communities, improved means of transportation have made it possible for growers of flowers and vegetables to locate where they can secure cheap land and feul, from which points the products are often shipped hundreds of miles. In other states, many farmers and fruit growers, whose time is occupied during the summer months with their orchard and farm crops, have erected extensive-ranges of greenhouses, which during the winter months are used for the production of vegetables and cut-flowers, and as the owners, for the meantime, become specialists, they not only find the work remunerative, but are thus able to occupy the portion of the year which is not required for their other work. With the cheap fuel, clear sky and comparatively short and mild winters, there is no reason why similar establishments will not prove even more satisfactory in Missouri. For such a purpose, the form of house best suited is the even span (Fig. 1). This should be not less than twenty feet in width, and of any desired length. If several houses are erected, they may be placed side by side, with division walls in common, but for most crops the extra expense required will be more than repaid by the benefits that will be derived when the houses are placed far enough apart to prevent the shading of one house by its neighbor, as well as from the light and ventilation that can be secured through the side walls. For roses however, the three-quarter span roof (Fig. 2), is generally preferred, while in sections where a slight slope to the south can be secured, a wide, side-hill house (Fig. 3) will be found adapted to the growing of vegetables, carnations, violets etc., and it will in addition be of comparatively cheap construction.

In many sections, fire hot-beds may be used to advantage. These vary in width from six to twelve, or even sixteen feet, the roof being formed of a single row of three by six feet sash in the first case, while in the latter there is a double row of sash from six to eight feet long arranged to form a span roof. The sides of the bed should be of plank a foot or so in height, against which the soil may be banked. In the wide beds, a ridge can be made from two by six plank and rafters can be provided upon which the edges of the sash may rest if desired, but at any rate,

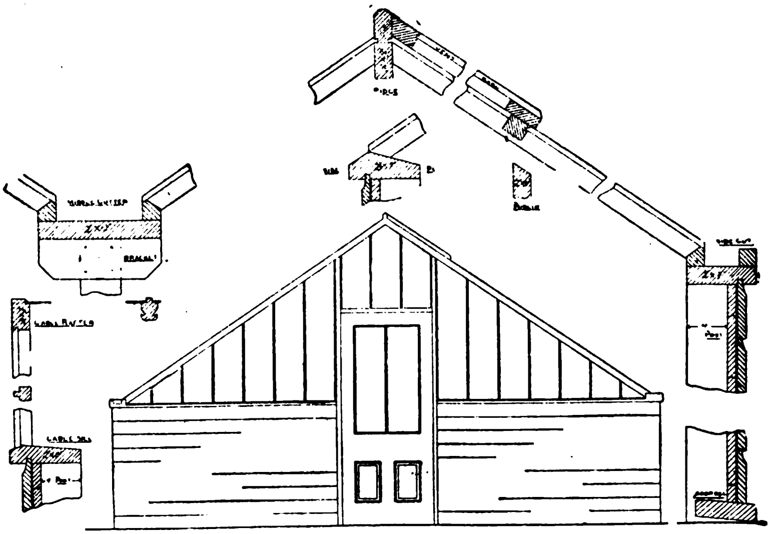


FIG. 1. (From Greenhouse Construction.)

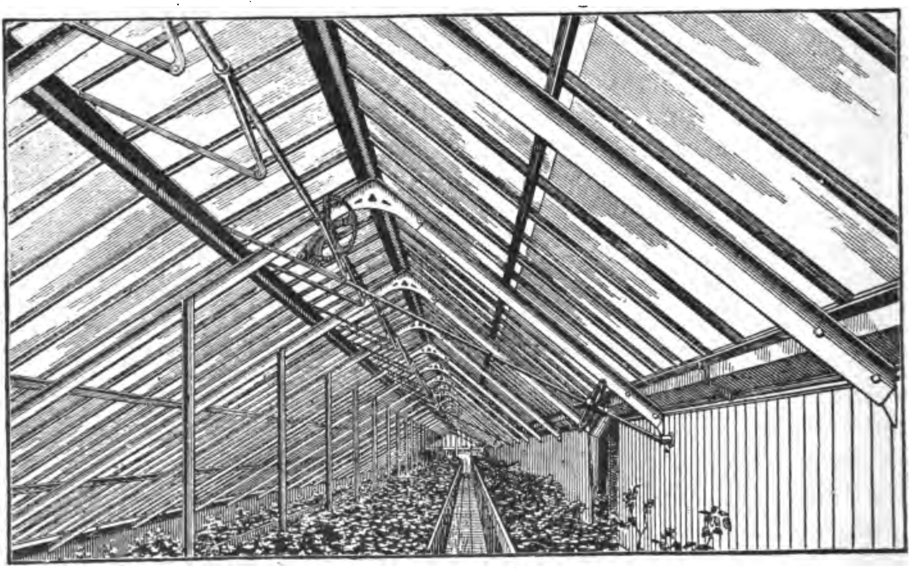


FIG. 2.

the ridge should be properly supported. The heat for these beds can be furnished from one or more flues of sewer pipe running lengthwise of the bed at a depth of from eight to twelve inches below the surface. If possible, the bed should be arranged upon sloping ground so as to secure a good draft to the flues. At the lower end of the bed, brick arches or furnaces should be constructed large enough to take in wood that is four feet in length. An arch ten by twelve inches and five feet long inside will answer for a bed six feet wide and fifty feet long. The tile for the flue may be either six or eight inches in diameter, according to the climate and the crops to be raised. For beds twelve feet wide, two lines of flues should be provided and these should be eight inches in diameter. In place of the flues, hot water or steam pipes may be provided, or if exhaust steam can be secured, it may be turned into lines of small tile, arranged as recommended for flues. Hot-beds built in this way serve a good purpose for the starting of vegetables and plants in the winter, or early spring, and for growing many of the vegetables such as radishes, lettuce and beets, and in southern Missouri in particular, their use would be found profitable in competition with northern growers who are obliged to use expensive greenhouses and a large amount of fuel to bring their crops to perfection.

While greenhouses would be most generally used for commercial purposes, there are many persons who as amatures erect houses in which to grow plants and flowers for their own pleasure. While good results can often be secured in an ordinary bay-window, it will be more satisfactory if a special room can be provided that can be cut off from the remainder of the house. Such a structure can frequently be placed in an angle of the dwelling so as to form a sort of veranda conservatory. This may be from six to ten feet in width and of any desired length (Fig. 4). The sides should be of glass,and if desired can be so arranged that they can be removed in the summer time to form a sort of open veranda. While the best results will be secured if the roof also is of glass, this will not be necessary. If the dwelling is heated by steam, or hot water, it will be a small matter to provide coils for the conservatory, and even if a hot-air furnace is used for heating the dwelling, it will often be possible to introduce a heating coil in the furnace to supply hot water for warming the conservatory. In other cases small independent heaters may be employed.

If more elaborate structures are employed, they may be built out from one corner, or from the side of the house, or may be entirely detached from it. If the size permits, it will be possible not only to grow a variety of plants for their handsome foliage and flowers but others may be propagated for use as bedding plants upon the lawn, and it will also be possible not only to start vegetable plants for the garden, but a great variety of vegetables may be forced to provide a supply for the table for the winter and spring months.

In the construction of greenhouses, cypress lumber is generally used for the plates, sash bars and ridge and in the better class of houses a framework of iron is used, upon which the wooden portions rest. While the modern, iron-frame (Fig. 5) construction is in many ways desirable, and will often in the long run prove most economical, the increased first cost will prevent it from being commonly adopted for ordinary greenhouse purposes. The iron-frame house may be raised upon a brick foundation, or iron posts may be set in the ground to which the side posts can be attached. Iron rafters are placed once in seven or eight feet and connectimg them are plates, purlins and a ridge, upon which the sash bars rest. With this form of construction, much lighter sash bars can be used than in wooden houses, as nearly all the strain and weight of the roof is borne by the iron posts and rafters. The house will also be much more durable, as the portions that are first to decay in a wooden house have been replaced by iron.

When wooden houses are used, posts of cedar or cypress (Fig. 6) should be set at intervals of from four to six feet. The height will depend somewhat upon the crops to be grown, and whether there is to be glass in the side walls. In the former case, four feet will be ample, while in the latter, four and one-half to five feet will be none too much. The walls can be formed of sheathing and block siding, with a double thickness of building paper between. If ventilation is to be placed in the side walls, there should be a sash sill arranged for them to close upon. Various forms of plates may be used, but they should be so arranged that they will provide a firm bearing for the sash bars, and for the running off of the water upon the inside, as well as on the outside of the house. In wooden frame houses, rafters are now seldom used, the usual plan being to depend entirely upon sash bars which rest upon one, or more, lines of gas pipe, or similar purlins.

The usual size of the sash bars is about one and one fourth by two and one half inches, and drip gutters in the sash bars are desirable. One and sometimes two continuous lines of ventilation at the ridge should be provided, and connected with shafting so that a line fifty to one hundred feet in length may be worked with one machine. In houses twenty feet wide, when a single row of ventilating sash is used, it should be from thirty to thirty-six inches wide, while if there are two rows they should vary from twenty-four to thirty inches, according to the kind of crops to be grown.

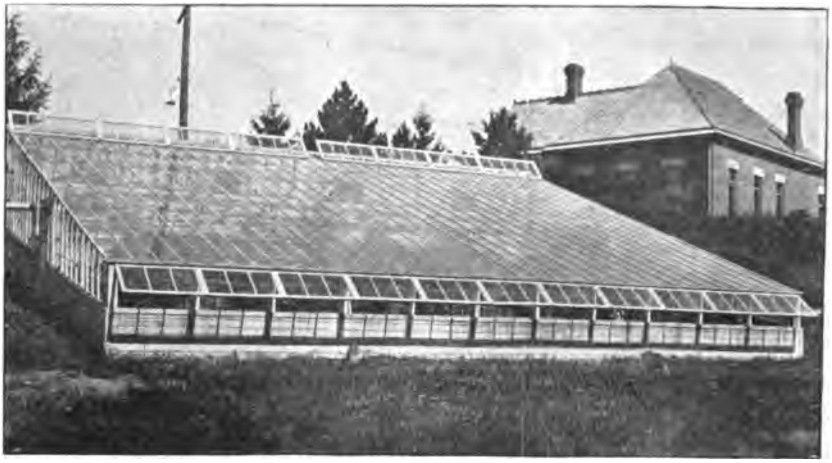


FIG. 3.

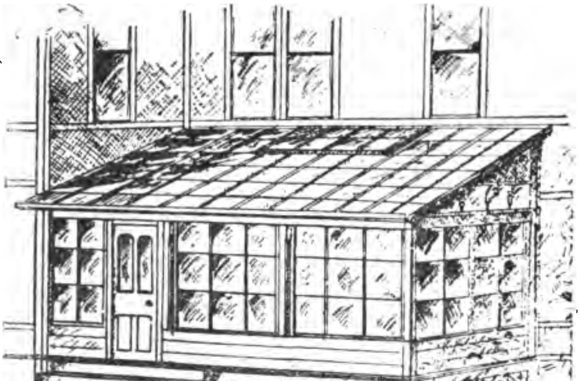


FIG. 4. (From Greenhouse Construction.)

For most purposes it is desirable to use glass at least fourteen by eighteen inches, and for roses, sixteen by twenty-four will be none too much. In setting the glass, a good grade of putty or mastica is used under the panes. If it is to be lapped, it is held in place by means of zinc points or brads. For many purposes, however butted glass is preferred, the size generally being sixteen by sixteen. The square form is desirable, as it permits of the turning of the panes so as to secure a perfect union between them. When the glass is butted, it is customary to use wooden caps, over the sash bars, which are screwed down upon the panes. This makes a warm and water-tight joint and permits the ready resetting of broken panes.

In three-quarter span houses, the south wall should be about the same height as the walls of an even span house, but the north wall should be about one half higher, if the long-span-to-the-south construction is used, but both walls may be of the same height in the short-span-to-the-south-house. The usual height of the ridge in a house twenty feet wide, is seven feet above the walls, except in a long span to the south in which the distance from the level of the south wall to the ridge is measured, and the ridge is so situated that the sash bars on the south side will be twice as long as those upon the north.

Either raised benches or solid beds may be used, the former being the most commonly employed for flowers and the latter for vegetables. In the construction of the raised benches it is desirable to use either gas-pipe (Fig. 6) or angle iron for the supports, although if constructed of wood they will last a long time when supported upon bricks or cedar blocks. In order to secure proper drainage, there should be cracks of one half inch to one inch between the boards used for the bottom of the benches. In some cases, tile or slate bottoms are used and with an iron frame work, will form a very durable bench. The former practice was to place narrow benches along the side walls, with one or more wide benches in the center of the house, separated by walks, but in order to bring the benches into the more desirable parts of the house, the plan of having walks along the side of the house, and of arranging for three or four beds, from four to five feet in width, separated by walks twenty to twenty-four inches wide, has been adopted. With solid beds a similar arrangement has been followed, except that the beds are somewhat wider, although seven feet is the usual maximum for violets and carnations. The height of the solid bed is determined by the kind of crop to be grown and the distance to the glass. The same care is required as with raised benches to secure good drainage. This is generally done by filling in with broken brick and similar material, and covering with eight inches of prepared soil.

Where sub-irrigation is to be used, the bottoms of the beds or benches are made practically air-tight, and one or two lines of drain tile are placed lengthwise of the houses. The water is turned in at one end through a hose and, following the tile, makes its way out through the joints. In three-quarter span houses with a long slope to the south, the benches are placed at different intervals, somewhat like a pair of stairs, so that those upon the north side will not be shaded, and that they will not be too far from the glass.

In sections where wood is cheap, a flue can often be used in small green houses, especially for the crops that require a moderately low temperature. If an arch with a fire-box measuring eighteen inches square and five feet long is placed at one end of the house, a flue twelve inches deep and eight to ten inches wide may be carried around a house not over fifty feet in length and brought back to a chimney built up from the top of the arch. When desired for houses more than fifty feet long, it is advisable to have an arch at each end. Where flues are used, care must be taken that the wood work of the house and benches is not in contact with their exterior. In some sections, ten or twelve inch sewer pipe may be substituted for the brick flue, but it should not be used within thirty feet of the arch.

For heating small ranges of green houses, some of the cast-iron hot water boilers, although they are comparatively high priced, will prove satisfactory and in the end economical, as they will be more durable than wrought iron boilers, especially if the latter are made in the form of box coils, from ordinary gas pipe. The joints of the latter being screwed together will expose more or less of the threads, and as a result, may not last more than two or three years, although with heavy pipe, the life of the pipe boiler may be seven or eight years, if care is taken not to have any of the threads exposed. For larger ranges where hot water is used, tubular boilers may be employed and will give good satisfaction, especially if the tubes are placed so as to fill the shell of the boiler. Although these boilers are made of wrought iron, the tubes are thicker than those commonly used for coil boilers, and the tubes being rivited rather than screwed into the boiler heads will be quite durable. Although not to be recommended for very small ranges, a considerable saving in the amount of pipe required for radiating surface in the houses can be made if the system is placed under pressure. Although there is hardly any limit to the size of the plant in which hot water under pressure may be used, a majority of greenhouse men prefer steam, for ranges of the size that will make the use of a night fireman desirable. While it will require rather more careful attention than a hot water system, steam as a means of heating greenhouses has

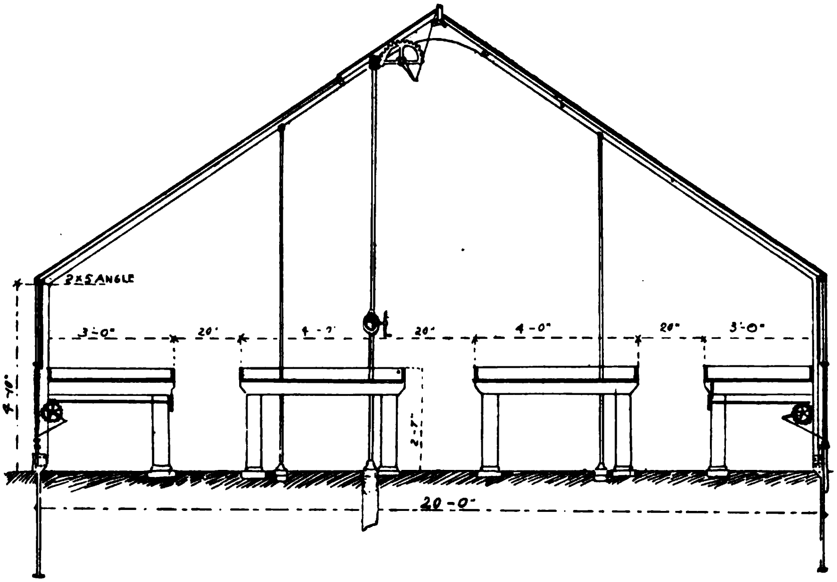


FIG. 5.

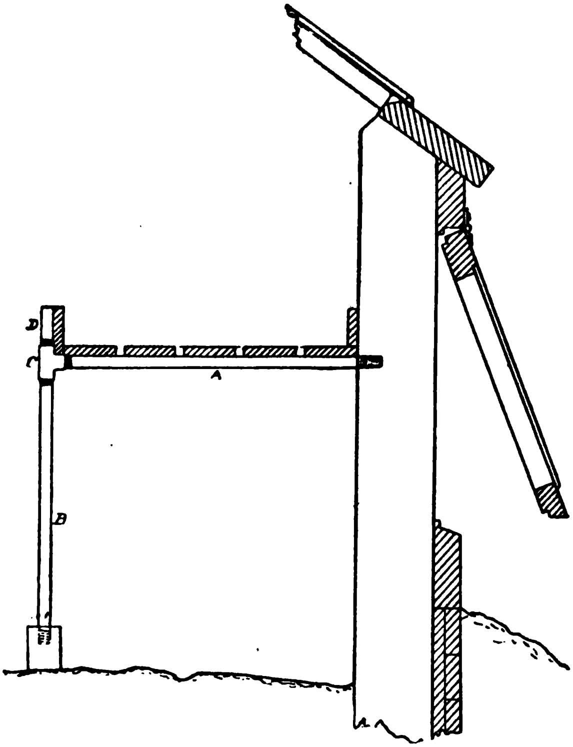


FIG. 6.
Section of Wall and Bench (From Greenhouse Construction).

some advantages. For ranges of houses with less than ten thousand square feet of glass, only one heater will be desirable, but if the amount of glass exceeds this, two or more should be employed. The heaters should be so arranged that either one can be cut out from the system in case of accident and for the purpose of making repairs. Having more than one heater, under such conditions will oftentimes prevent serious loss. During the fall and spring months, only one heater will be required, the other being held in reserve for use during the severe weather in winter.

For piping houses for hot water circulation, there has been a marked change in the kind of pipes used, in the last twenty years. Instead of the old fashioned four inch cast-iron pipes, wrought-iron pipes from one and one-fourth to two inches in diameter are used for the coils. In some cases, the coils include both the flow and return pipes, but more commonly the water is carried to the farther end of the house in pipes of a somewhat larger size, which are there connected with the returns. Although larger pipes are occasionally used, the usual size for the flow pipes is either two or two and one-half inches, the former being used for coils containing about two hundred square feet of radiation while the latter will supply three hundred and fifty feet. When the heater can be sunk so as to be below the level of the greenhouse floor, a fairly good circulation can be secured with all of the pipes under the benches, but better results can be obtained when the flow pipes are carried as high as possible, and the use of overhead flows becomes almost necessary where it is not possible to lower the heater. One or two of the flow pipes can be carried upon each of the rows of purlin and ridge posts, and others if necessary upon the walls. The radiation supplied by the returns will be rather more effective when arranged in horizontal coils, than when the pipes are placed one above the other, but from the fact that when the coils, in whole or in part, are carried upon the posts of the side walls they are out of the way, the verticle coil is often used. While good results will be secured whether the flow pipe is carried with an upward or a downward slope, the results if anything, seem to favor a down hill system. The slope should be merely enough to free the pipes of air, for which an outlet must be provided at the highest point. It is an excellent plan, especially when the closed system is used, to connect the highest point of each flow pipe, or the highest point of common system, with the expansion tank. The returns should always be laid with a slight slope toward the boiler, but if the larger sized pipes are used and are properly supported, this need not be more than one inch in twenty feet, the object being to carry the pipes as high as possible and at the same time have a sufficient slope to permit the air to escape.

The arrangement of the pipes where steam is employed, is quite similar to that in the hot water system, the particular difference being that the size is considerably smaller for both the flows and returns. The return pipes need not be larger than one and one-fourth inches, and for small houses, very good results can be secured with one inch pipe. As a rule a two inch pipe will answer for an ordinary house twenty by one hundred feet, except where high temperatures are desired. In the steam system, there should be an automatic air-valve at the lower end of each of the coils and, for controling the heat, valves are necessary upon both the supply and drip pipes, while in the hot water system only one valve is required, although two will be desirable in case there should be occasion to at any time cut off the coil in order to make repairs upon it. In the steam coils it is also well to have several of the pipes provided with valves in order that one or more of them may be cut off to control the heat. In estimating the amount of radiating surface that will be required, it is customary to consider that one square foot of surface will be sufficient for three of exposed glass, if the house is to be carried at sixty degrees, with hot water, and that it will answer for four or five square feet if fifty or forty degrees, respectively, are to be maintained. With steam heat, one foot of radiation will be ample for five and one half square feet of glass, in houses to be heated to sixty degrees, seven and one half, if fifty degrees is to be maintained, while only one foot of radiating surface to nine square feet of glass will be required in houses that are to be heated to forty degrees. The above figures will be found substantially correct in sections where the usual winter temperature does not drop below zero, and where the houses are well built and with a comparatively small amount of wall surface. Where the temperature drops much below zero, or where the character of the house makes it difficult to heat, these figures will need to be slightly modified.

With a house of modern construction in which the heating apparatus is properly arranged, a considerable variety of vegetables can be forced for the winter markets and these can be sold at remunerative prices. There is also a good demand for the flowers ordinarily forced in greenhouses, and any one who has a taste for the business and practical experience in handling the houses and the crops, will find it a promising field for his efforts.

L. R. TAFT, Horticulturist, Agricultural College, Michigan.

CULTURE.

Before the existence of man great preparations were made for his coming by a loving, unseen hand. At the divine touch, there sprang into view a real picture, so grand in its conception, so marvellous in execution and so exquisite in coloring, that artists in all ages have tried, in vain, to reproduce it upon canvas. Out of illimitable space and darkness the world was formed and six days were spent in adorning it for the grandest reception on record. With mighty roar the waters rolled back and ocean waves assumed white caps. The mountains, in fantastic form, rose from the deep, reared heavenward their lofty peaks and stored away in hidden vaults treasures of gold and silver, for future politicians to wrangle over.

Stationed in a grand garden, were magnificent trees of endless variety. Innumerable alcoves held rare plants, while choice flowers filled all space. Above, an arch of blue held myriads of lights of greater and lesser magnitude that flashed forth their rays by day and by night. From leafy recesses, floated out sweet strains from many an orchestra, while delicious fruits everywhere abounded. No dream or reality in after years will ever equal the impression made upon the mind of childhood by the pen picture of Eden, and into this garden of marvellous beauty and wonderful fertility were received our remote ancestors. But the restless spirit of man that ever urges him to seek higher knowledge, asserted itself first in Adam and through insubordination came the loss of this paradise. A more abject state can not be imagined, but judging from present conditions, it may readily be supposed that Eve had saved all kinds of seeds and had plenty of dried fruit on hand.

History now carries us forward 3,519 years and gives us its first account of landscape gardening. For forty three years Nebuchadnezzar reigned king of Babylon and made himself famous by his public works. Having married a Median princess, who grew discontented with the flatness of the Babylonian plains and sighed for her native mountains, he built, for her gratification the hanging or elevated gardens, classed among the seven wonders of the ancient world. Arches were raised on arches and stairways led from terrace to terrace and the whole structure of masonry were overlaid with soil, sufficient to nourish the largest trees, which by means of hydraulic engines were supplied with abundant moisture from the Euphrates. An impression of the immensity of these gardens can be had when we remember that they contained forests, rivers and cascades and in the midst of these groves stood the royal winter residence, surrounded by playing fountains and all the beauty of Eastern flowers. This retreat in most countries would have been more suitable for summer but here the cooler months were endurable alone in the open air. If, in this nineteenth century, a magic wand could be procured, woman would stretch forth her hand and surround man with all the fruits and flowers of Eden. If man possessed the wealth of the Babylonian king, he would put it into railroads, sugar trusts, wheat combines, sleepless nights and wrinkles; or or if he slumbered his dreams would be quite as appalling as were Nebuchadnezzar's, who saw, one night, while he slept, a vision that frightened him, but when the morning came he could not recall it. Before his accession to the throne he had been sent by his father to punish Pharaoh-necho, who had subdued the Syrian provinces and was holding them. During this campaign he had besieged Jerusalem, returning to Babylon with treasures taken from the temple and palace of Solomon and bringing prisoners, among them Daniel, who alone could recall and interpret the dream.

He saw, while he selpt. a tree, the heighth of which reached unto heaven and the branches unto the ends of the earth, affording fruit for all and shelter for beasts and birds.

While he looked there appeared an holy one from heaven, ordering the destruction of the tree, with only the stump of it to be left remaining in the grass to be watered by the dew. The interpretation was that he should be driven from men and during the loss of his reason should eat grass as an ox. He had spared neither time nor money in surrounding himself with all the luxuries of the world, but had neglected to sow in his heart the seeds of righteousness and hence his downfall. Neither divine power nor wealth is ours and honor and fame may not come to us here, but around us are materials for character building and within us resources for utilizing them in commencing a structure that will be finished in the ages to come.

Since the beginning sustenance for man's body has been derived from the soil, and in striving to gain this the soul often receives little nourishment. Agriculture was the primeval occupation of man and still ranks first, for its products sustain life. Heart culture supplies the food that enables us to live on through eternity, enjoying the glories yet to be unfolded, and therefore is second to none in importance. Around us this evening are honored guests, proud subjects of two rulers: the Creator of the universe, and King Horticulture. Their allegiance to the first increases their loyalty to the other. With the pleasure of their presence shall mingle the benefit of their words, while their influence shall linger with us, blossom with the trees in spring and ripen into summer fruit, more perfected and more delicious than ever. If we receive not their suggestions, coming from study and experience, it is our loss. If we heed them, not only ourselves, but others will reap the reward in well made horticultural improvements. It is generally conceded that a well kept garden is most conducive to comfort and happiness. On this great American continent, there are millions of acres lying waste, when a little thrift and economy would enable most of us to possess at least one acre, upon which could be raised an abundance of vegetables, fruits and flowers to more than supply the wants of one family, commencing with asparagus in the early spring and ending with persimmons in November, with plenty of salsify still in the ground, vegetables and fruits canned in the pantry, and apples, potatoes, celery, etc., stored away in the cellar. The first essential to the making of a good garden is plenty of energy. If it could be sealed up in packages and put on the market, the demand would far exceed the supply. As it can not be bought or borrowed it must be cultivated. The first rule to be observed and the one most neglected, is prepare the soil and plant the seeds. The second is do not put it off. There comes, generally bright warm weather in February, and if the ground is well drained or rolls to the south, it may be in a condition to work. Then before night plant your early peas, a few potatoes, onions, lettuce, radishes and spinach. The next day it may rain, and when others are waiting for the soil to dry in the spring, your seeds will be germinating.

Plant asparagus, you may have to wait on it two years, but after that it will, with light top dressing and very little attention, bear for you during your life time, and for others when you are gone. Set out strawberry plants and have for your table large bowls of fresh, crimson berries, three times a day for several weeks, instead of buying them in boxes with patent bottoms that will rise up and push the large ones to the top. Have cauliflower—plant early and cultivate as cabbage, except tying up the heads to bleach them.

Raise celery and know what the sweet, crisp article is, fresh from the garden or cellar. Have tomatoes and serve them whole on crisp lettuce with mayonaise dressing—being in this respect a greater man than George Washington. In a beautiful spot, on a cliff overlooking the Potomac, his head had been resting under the green sod of Mount Vernon over thirty years, when they were first introduced into the United States as food—being a native of South America.

Cultivate the flowers that brighten life, supplying a want that nothing else can fill. Did you ever hunger for them. At the recent flower show in Chicago the managers felt well repaid for their work by the presence of one visitor. When he came into the room the delicate odor reached him, and a pleased expression shone upon his face. The visitors gathered about the blind man, describing the beauty of the coloring, while he touched tenderly the petals, getting the outlines of the flowers. For hours he staid, enjoying even the poorest blossom.

What a glorious day awaits him, when he shall behold the grandeur of the flowers in a country where all is sunshine. Let us cultivate the senses and be prepared to enjoy the beautiful when it comes to us in its fulness.

One of the most marked features in the progress of the world, is the new pursuits of woman from which agriculture is not excluded. A school has been established by Lady Warwick on the Thames, near London, for teaching girls over the age of sixteen scientific farming. England is not in advance of America in this reepect. This year fifty girls have taken up the scientific study of farming in the College of Agriculture at Minneapolis. Girls are admitted to the college on the same conditions as boys. The agricultural course covers a term of three years, and includes every practical subject needed for farming—field crops and seeds, agricultural engineering and chemistry, farm economics, dairying, horticulture, forestry, etc. No classics are required, but German, French and Scandinavian are substituted as being of more value to the study of scientific farming.

When it becomes general, and woman adds this pleasure to her light duties, man will have time to—— smoke.

Around us to-day, no progress is more noticeable than in the field of literature. Books, periodicals and newspapers are abundant, and cheap. Let us cultivate the mind, placing around ourselves and others, all the culture that radiates from pure thought and language, coming to us through these mediums, and frown upon anything that detracts from growth of mind or morals.

Then we must conclude that our stay here is no mystery, and our future home almost visible. Our preparatory work here must be thorough, so that we may assume the higher branches of knowledge there, and pursue them with ease. Heart culture is imperative—mind culture essential, and horticulture necessary to sustain life with palatable food during our school term.

MRS. W. W. GARTH,
Columbia, Mo.

Recitation by Master Barton Robnett, "See'en Things at Night."

SECOND SESSION

Wednesday, December 7, 9 A. M.

Call to order by President N. F. Murray.

Prayer—Dr. S. F. Taylor, President of Stephen's College.

Greetings from other State societies were read and an introduction of the guests of the society followed.

Indianapolis, Ind. Dec. 6, 1898.

L. A. Goodman Secretary of State Horticultural Society, Columbia, Mo:

The Indiana Horticultural Society sends greetings may you have a profitable meeting.

J. TROOP.

Princeton, Ill., Nov. 25, 1898.

To the officers and members of the Missouri State Horticultural Society—Greeting:

I take pleasure in announcing the appointment of our Vice-President, Mr. H. A. Aldrich, of Neoga, Ill., as a delegate from the Illinois State Horticultural Society, to attend your annual meeting. Mr. Aldrich is a practical orchardist, and I feel confident that his visit to you will not only be pleasant and agreeable, but a profitable one to all concerned. Kindly remember the date of our annual meeting at Springfield, December 27, 28 and 29, 1898, where we shall expect to welcome at least one of your number.

Yours Fraternally,

L. R. BRYANT, Secretary.

Osage, Iowa, Oct. 31, 1898.

To the officers and members of the Missouri State Horticultural Society:

GENTLEMEN: I take pleasure in sending to your Society as our delegate, Mr. M. J. Wragg, of Waukee, Iowa. He is Vice-President of our Society.

Yours Fraternally,

CHARLES F. GARDNER, President.

The following from out of the State were present:

H. E. Van Deman, Parksley, Va.

M. B. Waite, Assistant Pathologist, Washington, D. C.

Prof. L. R. Taft. Agricultural College, Michigan.

W. H. Barnes, Secretary Kansas State Society, Topeka, Kan.

M. J. Wragg, Vice-President Iowa State Society, Waukee, Iowa.

H. A. Aldrich, Vice-President Illinois State Society, Neoga, Ill.

E. J. Baxter, Nauvoo, Ill.

Appointment of committees was as follows:

On Fruits—H. E. Van Deman, Parksley, Va.
M. J. Wragg, Waukee, Iowa
J. S. Butterfield, Lee's Summit, Mo.

Flowers—H. C. Irish, St. Louis.
J. E. May, Wilson.
K. B. Wilkerson, Mexico.

Finance—J. C. Evans, Harlem, Mo.
J. T. Snodgrass, West Plains, Mo.
F. H. Speakman, Neosho, Mo.

Obituary—J. M. Irvine, St. Joseph, Mo.
A. H. Gilkeson, Warrensburg, Mo.
J. Baumgartner, Columbia, Mo.

Final Resolutions—Levi Chubbuck, St. Louis, Mo.
H. A. Aldrich, Neoga, Ill.
R. J. Bagby, New Haven.

General Subject—"ORCHARDS."

THE GROWING OF NURSERY TREES.

The first part of this subject to which we wish to call your attention is the ground. The kind of ground and the preparation. Clay or poor soil, good soil and very rich soil. These three we will take for growing the apple tree.

First, we will take the clay land on which we have planted grafts with the following results: It takes three years to grow a tree ready for market, and only about 50 per cent of the number of trees that were on the ground made fairly good trees. Neither were they straight bodied trees, but they seemed to have strong roots that reach far out in the earth, but not so many as when grown on richer ground. They will not deliver well on account of their shape and appearance. Yet, when set in orchard will live well and make good trees. But we have quit planting grafts on this kind of ground for two reasons. First that it takes three years to get a tree ready for market when we ought to have it ready at two years old. Second that we can not compete with other nurseries in price who sell their trees at two years.

Next we will take the extreme very rich land. This test was made on fairly rich land with 150 loads of barnyard manure to the acre, plowed under deep in spring and planted to corn. In fall the ground was cleared of stalks and stubs, plowed and subsoiled, first plow going from 9 to 12 inches deep, subsoiler following in furrow going about the same depth, making 18 to 24 inches deep. The following spring planted our grafts. The first year they grew and did well, only where a graft was too close to some manure that was not thoroughly rotten. The second year they grew fairly well but not so well as the first year, but made extra straight and well headed trees, with exception of a few varieties, and a tree that would please a customer in the retail trade. But there was one thing lacking and that was a fine sytem of strong roots. The ground was so rich that it seemed to give the trees all the nourishment they needed right at them, and they did not have to go after it, so did not develop as fine roots as they would have done under other conditions.

Third and last we will take good soil that would grow a good crop of corn; well drained, but not too rolling and thirsty. This we believe to be the ideal ground for growing apple trees that will be ready for the market at two years old. We still subsoil; but, to say that is best, we will not, but will leave it for those with more experience to answer.

We will next take the apple cion, stock, graft and bud. The cion for grafting, we think best to cut the cion as soon as they are well matured after there has been frost enough to kill the leaves. In regard to cutting cions when hard frozen, we have not made it a practice, but guard against it. We find they can be cut any time during the winter when not frozen and they will grow. We have not seen any difference as to when they are cut, yet, we aim to get them in as soon as we can.

The surest way we have found to pack cions and grafts is in sand, though that is lots of work, while excelsior and saw dust will save time and labor and can be done successfully if managed right and watched closely. We would suggest those with small nurseries to use sand, large nurseries use excelsior or some like material, as they have the opportunities to give them the proper attention at the right time, while those with a few thousand may neglect and let them get too dry.

What kind of graft or bud? This is a question we believe has puzzled the farmer and retail trade more than any other question connected with the nursery business. While I am yet in my twenties, I began selling trees nine years ago and have been on the road about one-third of my time, have sold about $15,000 worth of stock during this time, I have been questioned about bud, whole root, piece root, crown graft, second cut, etc., more than any one question. We have had some experience with all of the above. We will say here to those who contemplate going into the fruit business with but little experience, to be sure and hear the discussion on this subject after it is given to the society for discussion. For we believe if many a man had heard a thorough discussion on this subject by thorough honest and competent horticulturists of from twenty to fifty years of experience along this line, such as our worthy President and Secretary and many others now before me, they might have saved hundreds and thousands of dollars that they have payed out for fruit trees where they payed extortionate prices just in order to get something better than was ever offered to the public before, instead of patronizing his home nurseries and getting his trees at a much less price. We have budded the apple which makes a nice tree, but as for making a practice of it, we do not, for we believe grafting is better, everything considered.

We graft mostly on number one stock, cutting cions three to four inches, roots five to six inches, making a graft eight to ten inches long, making one graft grafted at the crown; also, some will make one grafted on the second cut. In some places where the ground is sandy and loose it might be best to shorten the root and lengthen the cion. But with us where ground is more compact, we prefer the above. We have kept the first and second cuts separately in order to ascertain the difference. In the first cut or crown graft, it throws out two layers of roots, while the second cut did not make as fine stand nor have as fine surface roots, but the lower roots were much finer. But as to the difference, we would not make any. We would not make any difference with the tree, it matters not how it was propagated, so it has fine roots. Our experience with piece root trees is that their roots are not so close to the surface as where it is in what is called a whole root or crown graft.

We care not how they are propagated so they have a fine system of roots. Budded, whole root, piece root, crown graft, second cut or what not. We believe if the planter wants piece root trees, all they will have to do is to plant their trees about one foot too deep, and they will get all of the piece root trees they want, regardless of the way they were propagated. On the other hand, if they want whole root trees, they should set a tree as nature would set it.

When and How to Plant Grafts: We believe that ground should be plowed in the fall, then in the spring as soon as danger of cold weather is passed, prepare the ground by thoroughly pulverizing. Then mark off the rows three feet eight inches apart, then plant grafts eight to twelve inches apart in the row, leaving only one or two buds above the surface. We believe there is one mistake many make and that is by not getting grafts out in time, at least it has been upon our part.

If too late it means a heavy loss and poor growth, which was the case with us last season. We believe in thorough cultivation, especially in the early part of the season, and in the drouths we keep a one-horse harrow and roller going most all the time, making a dust mulch for the purpose of holding moisture. We throw a considerable ridge to our trees in late fall with a disc cultivator for three reasons.

First, to keep the freezing and thawing from lifting them. Second, it has a tendency we believe to keep the rabbits from cutting them so badly. Third, if weeds should get the advantage of us in spring, barr off with a Diamond plow, then break out ridge leaving trees almost clean.

We practice rubbing trees with gloves in spring when buds are about an inch long, using boys to do this work from twelve to fifteen years old. Each boy takes with him a standard twenty-four inches high. When a tree is thirty inches high or higher, we rub the full length of the standard. The smaller ones we rub according to height, allowing from three to six inches at the top not rubbed. In varieties like Jonathan and York Imperial, some may get top heavy when managed this way. Every thing considered we believe this is the best way to manage them. After this the tree will begin to throw out some sprouts along the body where rubbed which we let grow until we think best to cut off, according to variety, size of tree, etc. We have found it most profitable to clear the block at two years old, selling as many of the smaller grade as we can and burning the rest.

This season we expect to leave most of the smaller grade stand, believing it best.

We get better roots by digging with tree digger than with spades, and at a much less cost. Then we haul to our packing grounds, where we grade and label.

We will next take the peach.

Kind of ground:—We believe ground should not be too rich for peach. Pulverizing thoroughly, then level and mark off same as for apple. Mark from one to two inches deep, then plant seed about fifteen to the foot, then cover two to four inches deep. We use a disc cultivator, but it takes an experienced man to do this work, or he will let disc run to one side and throw seed out. Our experience is that early planting is best. Estimating 4,000 seed to the bushel it will take about forty-four bushel of seed to the acre. We expect about one-half of the seed to grow large enough to bud. We set some June buds, but as a general rule, we believe it will not be a success, neither to the producer nor the consumer. We find a few exceptions to this rule.

In budding the peach we aim to begin by July 20th, and close by

August 20th. We have lost some by budding too early, but more by budding too late. The season has something to do with this. We have budded both ways, pushing the bud up and pressing it down. Either will do but we have adopted the latter way altogether. We use as material for tying buds No. 8 to 10 carpet warp, cutting it the desired length. We have found it cheaper to cut wraps than to unwrap and use string again, but we have had better success unwrapping.

In heeling off, or cutting tree off just above the bud: This work seems simple, yet it is very important. It should be done in spring as soon as danger of cold weather is over. If we wait until sap comes up too much, we find the buds do not grow as well. We aim to watch hands close while at this work, for two reasons. First, to keep them from cutting too close to bud; Second, where stock is too large, from splitting it. Stocks seldom split unless full large. We would always rather cut high than too low.

Suckering or breaking sprouts off: This is also very important, and we believe ought to be done as much as possible by experienced men in order not to pull the bud off and leave seedling, as we have often seen done by new men, both through carelessness and ignorance. The above we learned by sad experience.

Pruning the peach: This will vary according to whether thick or thin on the ground. We think they make better trees where they grow close together. The lower limbs should be cut off; just so it is a nice looking tree we think is sufficient, as they will have to be cut to a stub when set out in orchard for best success.

In regard to carrying the tree over winter by burying it; the following are the results: The first time we tried burying the trees by covering up the entire top. They came out in spring as bright as when put in and in the best of condition. This test was made with well matured trees.

Second test trees burried as above; they were not well matured; results as follows: When taken up in spring, they were full of black spots, and many of the limbs were entirely dead, and those that did live, did not grow well.

We made a test this fall with a late growing seedling peach while it was growing very fast, stripping some trees and leaving some. The ones we stripped hardened up well, while the unstripped grew right along, and when frost came they were growing and very tender. The above taught us that what would be a success one time might be a failure another, and, what was one man's success might be a failure with his neighbor. For the reason that the test was made under different circumstances and at different times. About seven years ago I read in a paper where a man had made a success of cutting one year old apple trees off at the ground in the spring and they made extra fine trees, much nicer than if they had been left uncut, so the first thought struck me I would try it, and see what I could do. I got my pruning shears and started for the nursery. My father saw me and asked, "what are you going to do?" I answered, I am going down in the nursery. By the time he could make a few remarks I was gone. For the simple reason I was not hunting a discussion, but one year old trees to experiment on. After I had gotten far enough away so he could not find me, until I had completed my work, I began in earnest cutting the trees, I cut from ten to twenty-five of a variety until I had cut from one to two hundred of his trees. Then I picked up the trees I had cut off and carried them to a branch near by, and in they went. Hoping that my father would not come near that spot which he did not I suppose, as I heard nothing very serious to that effect, I then went leisurely back to the house, hoping my experiment would be a success, as I followed the directions as close as I knew how. But alas! the writer had not given the details of the subject, but brought out the one thing very flattering, and that was his success, and of course that is what I was expecting. But my experience taught me at the end of two years that it was a failure. For the simple reason I did not do the work when he did it, for I suppose he did it before the sap came up, and I did it afterwards. He must have had poor one year trees. Those I cut, some were extra good and some were poor. The poorer made much the finest trees, for the reason they had much the finest buds near the ground, and the larger did not. They were higher up and were cut off. This is to bring out the point I am trying to impress upon your minds; that what would be a success one time might be a failure another, and what would be one man's success, might be the reverse with another, for this reason the test was made under different circumstances, at different times and in different ways.

The Plum. We use the Mariana and peach for stock to bud on. Some varieties seem to do well on peach, while other varieties seem to do best on plum. While many varieties of plum do well on peach, peach on plum is not a success. We have had but little experience with the Maribolan and other types of stock. There is one type of stock the name I do not know, that some Nursery companies use. It sprouts almost as bad as Locust. A detriment to any one. Believing Mariana good enough for us we expect to use it exclusively, as it sprouts less than any known to us.

The Pear. There are three kinds of stock principally used for propagating the pear, French and Japan for standard and quince for dwarf; can both bud and graft, but budding is mostly practiced. We believe that pear should be set on clay subsoil. The quince should be planted on richer ground than pear. Set stock early in spring. We were delayed last spring on account of the wet weather and the result was, only about 50 per cent of our stock grew large enough to bud on. When buds are set early in season some of them will begin to grow, but still they seem to do well and make larger trees the next season. We consider the four best varieties of pear known to us is Kieffer, Garber, Duchess and Seckel, were it not for blight we would include Bartlett as we consider it one of the best.

K. B. WILKERSON,
Mexico, Mo.

PLANTING THE ORCHARD.

The subject which I am to discuss on this occasion, is one that has engaged my particular attention for the last six or seven years; and, in fact, through my whole life I have been a close observer of the plans and methods of different people in preparing, planting and caring for orchards. While there are almost as many ways as there are planters for planting and caring for an orchard, many of them being handed down from generation to generation, and are handed around free gratis, especially to those who contemplate setting out an orchard of some magnitude. Some will say you are a crank. Some will say the business is being overdone, and others that it doesn't pay. This is more apt to be the case in localities where there are no commercial orchards, but this all dies away as they see the orchard develop.

It is remarkable how much information one can get from some of those around him who practically have had no experience and haven't a dozen fruit trees growing on their whole place. They can tell you the kind of soil; how it should slope; the age of the trees; the varieties that will pay best; the kind of wash or paint to keep the rabbits off, and the borers out, and much other valuable information that is so essential to the fruit grower if it did not consist of such great variation. However, variation is a good thing sometimes. Then there are some of the fruit tree agents with their vast amount of knowledge and their various hobbies. One can tell you the great advantage of the system, adopted by the nurserymen for whom he is working, in propagating; the great advantage that budded trees have over grafted, in long lived trees, and will even have sections of wood showing the union, to prove his assertion. And another will come along with the whole root theory; and he will tell you that the reason of the shortness of the lives of the trees in the present age is, because they have been grafted on pieces of root instead of the whole root, as was the custom when trees lived so long, and that it is to your interest to buy whole root trees.

And then there are even some that have Russian varieties, or other fictitious varieties. They are very hardy and always bear, and rabbits and borers won't bother them. And in order to introduce them in your neighborhood will let you have them cheap, perhaps forty or fifty cents each, and will insure them to live. All of these things are very convincing, but will do you no harm if you will let them alone. But all of these tend toward the discouraging of the planting of orchards. For, perhaps there is no other industry so little understood, or in which such little interest is manifested as there is in fruit growing in a large part of this, one of the best apple growing countries in the known world. And I suppose it was for this cause that this society was organized years ago: To build up and foster the fruit interest in this great state of ours. And from the labors of a few men (some of them are with us yet and many of them have gone to their final reward) have grown an influence that is being felt all over this state and not this state alone but to all the surrounding states. And from a few comparatively small orchards scattered at intervals far apart, has grown an industry that bids fair to increase until every hill now covered with briars and brush will be crowned with luxurious growing orchards and from a revenue of a few dollars increase to a revenue reaching far into the millions; and we have just fairly begun, for in many parts of the state the fruit interest is as yet in its infancy. With a better understanding of the necessary treatment and the profits of an orchard the business will surely increase until almost every suitable locality will be covered with beautiful bearing orchards of delicious fruit to gladden the eyes of the beholder, and to benefit the possessor; to give health and vigor to the feeble, and to bring wealth and prosperity to the country. It is for this cause this society is laboring, and meeting from place to place throughout the state, imparting to each other and the world our knowledge and experience and observations that all may be benefited.

While most, if not all, make mistakes, it is by telling our mistakes that will cause others to avoid them, and by explaining our success will cause others to avail themselves of our experience and share our success.

It is for this cause that I will endeavor to give to you some of my experience and observation in orcharding, especially tree planting. In the first place it is necessary to have a suitable soil, which is not very difficult in this state, for most of the soil in the state is suitable for fruit growing. It must drain well. It should have an open, porous or gravely subsoil which will not hold water and cause the roots of the trees to rot. Most of the timbered land in this state and a large part of the rolling prairies are good orchard land. It is not necessarily the richest land that makes the best orchards, for we have seen many fine orchards growing on thin white oak land that would be almost worthless for the growing of ordinary farm crops. Much of this kind of land which brings the farmer in debt, or on which he is barely making a living could be made profitable and the owner made independent if set out in orchards. It is not really necessary that your land have a certain slope, or slope in a certain direction just so you have a slope either east, west, north or south. Some varieties may do better some seasons on certain exposures than others. But perhaps the next season it will all be changed. Excepting early blooming varieties which should not be planted on a steep hillside sloping to the south, a gentle slope does not make very much difference. The ground should be thoroughly and deeply ploughed, if possible in the fall before planting; if this can not be done in the fall, then as early in the spring as the ground will do to work.

Clean out all the hollows, if you have any, of all brush and briars and everything that will harbor rabbits for they like to live in our orchards and are always on hand when not wanted (just like some people that I have seen).

And now comes one of the most particular and difficult tasks in the whole business; and that is the selecting of trees, the right variety, the right age and the right quality.

Go to your nearest reliable nursery when possible or deal with some nursery firm which has a reputation for straight and honest dealing. Never buy from tree dealers for then you don't know what variety you are getting and mistakes made in this particular can never be rectified because you will not know it until they come into bearing and then if it is a worthless variety you have lost your money, your time and your labor. Don't buy stunted three or four year old trees just because you can get them cheap or for a little money. Such trees are not cheap at any price. Don't be persuaded to buy something that you don't want or don't suit you by some sleek tongued agent whom you know nothing about.

Select marketable varieties that you know do well in your locality. Some varieties do well in some localities and are almost worthless in others. Some varieties do well in almost all parts of the state.

Don't go too strong on new varieties until they have been thoroughly tested for some of them are failures.

Select two year old trees well rooted and thrifty. It doesn't make any difference whether they are whole root, piece root or budded, so you get thrifty, well rooted trees, though many argue to the contrary. Sometimes when trees are not to be moved very far and proper care is taken, older trees can be set with fairly good success; but I would prefer two year old trees.

When you get your trees from the nursery, if you are not ready to go to setting and if they come in bales or boxes they should be unpacked and heeled in, in the driest spot you can find, where the soil is loose and rich.

Don't let the sun shine on the roots any more than you can help. If the roots are any ways dry pour a little water on them. If the tops seem to be wilted cover the entire tree up with moist soil until it swells to its natural size. Then having your trees all ready, get your tools all in good shape. Have them sharp and bright so there will be no delay, when the ground gets dry enough to work, for a great deal depends on expediting the work at this time.

Perhaps the best tool for digging holes is a long-handled, round-pointed shovel, as you can stand up straight and scoop out the dirt with more ease than with any other kind of shovel I have ever seen tried. In laying off your orchard if you have anything like a hard pan subsoil, lay off your rows with a two-horse plow running several times in the same place or use a subsoil plow. Be sure that you get a little deeper than the trees will stand when set in the ground. But if you have a porous or gravely subsoil then the ploughing is not particularly necessary as it is done to drain the water away from the roots and is more beneficial for this reason than any other. It also saves digging with the shovel and can be done much quicker but no better, nor do I think as well, and would not recommend it unless the nature of the subsoil demandes it. When not using the plow, a line is necessary. A check row wire is a good thing. Stretch your wire across the field in a straight line, using stakes to sight by, one at each end, and enough between so that you can see the wire all the way between stakes. Having run one straight line then stake off a line at right angle with the first at the widest point in the field, or if the field is square then at one end is the best. Be sure to get your last line at an exact right angle with the first.

Place your stakes in the last row just as far apart as you want your rows. I plant rows running north and south nine links or nine corn rows apart and five links or five corn rows apart in the row. This makes the trees stand about 17 by 33 feet apart, which makes them very convenient to work, and you can cultivate in corn which I think is the best crop to cultivate in an orchard for the first two or three years. It makes it very convenient to plant just eight corn rows between the rows and will always give an open way running north and south through the orchard giving the sun a good chance to shine on all parts of the tree and close enough together in the row to shade the bodies of the trees during the hottest part of the day. Now take a basket of small stakes. Start in on the first row. Stick a stake down at every fifth link, always sticking the stake on the outside of the wire so that it won't drag the stake down when moving to the next row. When you have finished the first row, go back to the beginning, or have someone else to, which is better, and move the wire over to the next row. Then stretch the wire as at the beginning. Always tighten the wire to about the same tension. Be sure to have all your rows the same distance apart and the same at each end.

It is better to have the same person with the same measure to do all the measuring and staking for he will be less liable to make mistakes than if different persons were to do the measuring. Now we are ready for the digging of the holes. Commence on the first row. Take up the little stake that marks the place for the tree. Move it back on a line at a right angle with the row on which you are at work. Stick it far enough back to be out of the way in digging the hole. Dig the hole around where the stake first stood. Dig it a little larger than the spread of the roots and a little deeper than the tree will stand when set. Then fill up the hole to the right depth with loose dirt. Make a little mound in the center of the hole on which to set the tree. Some trees have roots that will fit down over the mound and some do not; however, the mound will be all right.

When you come to a drain or low, swampy place (if you have any), skip them. By this you will save both labor and trees, as no apple tree will live when its roots are continually standing in water. When you get your holes dug, or if you have hands enough to carry on both at once, you can commence setting. Take up your trees from where they have been heeled in, put them in a wagon, cover the roots with wet straw or something of that kind, haul them to where they are to be set and take them out just as they are needed. Never let the sun shine on the roots more than you can help. It is best to have two or three hands work together in setting trees. One to handle the trees, to cut off all broken and bruised roots, cutting from the under side with a sharp knife. Spread out the roots over the little mound in the hole. Set the strongest roots to the southwest. Set your tree even with the little stake on a line running at a right angle with the row on which you are at work. Then hold the tree in an upright position while the other hand shovels in the dirt. Work the tree gently up and down while this is being done, so that the fine dirt will sift down through the roots. As soon as the roots are covered well commence tramping and continue until the hole is full and rounded up a little. Let the tree stand so that when the ground has thoroughly settled it will stand about like it stood in the nursery. Don't set too deep, always remembering that the feeding roots get their supply from near the surface. Keep your trees in a line in the row by sighting after the first two trees are set, and after the first two rows are set you can discard the little guide stakes and sight by the trees already set. This may seem to some to be an unnecessary trouble, but it takes but little time and looks a great deal better and is better than to have your rows crooked and uneven. And in after years when looking over your orchard and seeing the straight lines of trees running in every direction you will never regret the time and patience taken in getting your trees straight.

I prefer to prune the trees after they are set as I can then see and judge better what to take and what to leave, than I could while the tree was out of the ground. And then it is very essential to know the nature of the growth of the different varieties, for some varieties have a very upright growth similar to a pear. These should be headed low. Others have a medium upright growth. These should be headed a little higher. And some varieties have a spreading growth and though they are headed high the limbs will reach the ground. Then if you head them all alike (like I have done) some of them will be too high and some too low and some about right. Now there are other ways of laying off aud planting an orchard but I think the above is the best and simplest way that I have ever tried or seen tried and any one following these directions need have no occasion to complain of dead trees if they have been properly handled before you get them; and with a watchful care and after cultivation, keeping up with diseases that infest our orchard and their remedy, the various insects and their destruction, with a determination to succeed, with patience to await your reward, surely your labors will be crowned with success.

D. M. HULEN, Hallsville, Mo.

DISCUSSION ON ORCHARDS.

L. A. Goodman:—I have tested cutting off one year trees in the nursery but I would not cut them off at the ground when I have good straight trees, three feet high. I have cut off small trees in this way and had them make nice, smooth, beautiful trees. We have done this numbers of times and have succeeded. I never prune any tree after it is planted. I prune with the tree in my hand, looking at its roots, and pruning according to the root, so that it is balanced. If a tree is not well rooted you should prune more than if it had good roots.

Mr. Boucher:—I was one of the first men to advocate and practice setting trees wider one way than the other. I have the rows thirty-three feet apart and the trees sixteen and one half feet apart in the row, always having the wide spaces open from north to south, thus letting the sun shine on the east and west sides of the tree and protecting the trunks from the rays of the sun in the hottest part of the day. I am well pleased with the results of this method.

Question:—Do you plant all varieties this way?

Mr. Boucher:—I do not plant all varieties any way. There are some varieties that should be closer than others.

Mr. Van Deman:—In Kansas I followed that plan of planting, one rod by two. Instead of planting blocks all of one variety I would mix the varieties, using quick bearing kinds, such as Missouri Pippin for fillers, planting every second tree of this kind and putting in another row of these fillers making the trees stand one rod apart each way, three-fourths of them being of the early bearing kinds to be removed when the trees begin to crowd each other. This plan will work all right if you will cut out the trees when they need it. If you have not the nerve to use the ax you are not fit to plant in this way. I cut them out in about fifteen years, but the time for cutting is to be determined by the actual condition of the orchard. I learned from Mr. Wellhouse, of Kansas, the largest apple grower in the world, who raises his own trees, a method of planting root grafts which saves much labor. Instead of making his rows and planting with a dibble in the usual way, he takes the forward part of a two horse corn planter with the wheels off, using only the runners. After the ground is put in good condition to plant he weights these runners and cuts little gutters or trenches in which a boy will plant ten thousand grafts in a day, with a man to follow and tramp the soil firmly around the grafts.

J. H Monsees:—I use a coulter with two horses to loosen the ground before setting the grafts and also to press the soil to them by running it on each side of the row.

Mr. E. Lilly:—How many bushels of peach seed does it take to plant an acre? I understood Mr. Wilkerson in his paper, to say forty-four bushels. I think that would make them entirely too thick.

G. T. Tippen:—I think twenty bushels will give a tree to every two inches in the row.

C. M Stark:—We plant peach seed with a two horse planter, which plants two rows like a corn planter. It drops the seeds with about half an inch space between them. Boys used to drop them too thick especially when the weather was cool, late in the season. Their fingers would get cold and they would hurry to get the bag empty.

Mr. Murray:—Is it necessary to grow peach trees close together to keep them from growing too large?

Mr. Stark:—Large trees, grown wide apart, are too heavy and bushy and are no better for the planter; for all peach trees should be pruned to a stick when planted in the orchard.

Mr. Wragg, of Iowa:—We plant fifteen bushels of peach seed to an acre and get as good a stand as we want, and the trees grow as large as we want.

We can not get boys to plant grafts in a furrow as described by Mr. Van Deman. They break too many of them at the point of union. We plant with an ordinary dibble. Three thousand make a good days work. We plow in the fall and plant early in the spring.

Question:—Does Mr. Van Deman cut out three fourths of the trees in his close method of planting?

Mr. Van Deman:—Yes.

E. J. Baxter, of Illinois:—Thirty-three feet between the rows one way is necessary to give room for spraying on both sides of every row. I would cut out the fillers as soon as the branches meet. In this way we would have symmetrical trees, and plenty of room to spray.

THE ROOT PRUNING, IN TRANSPLANTING APPLE TREES.

Probably in no other phase of apple tree growing is so much difference of opinion expressed by leading fruit growers, as in the manner of pruning; and the fact that eminently successful orchardists frequently follow methods essentially different from each other makes the problem none the less easy to solve. Of late years in particular, there has been a tendency in certain sections to depart from the teachings of the older horticultural authorities, and adopt methods radically different. Whether a modification of the rules was demanded by conditions of the newer horticultural sections differing from those of the older settled parts, when the previous rules have been formulated, or whether the failures of the more commonly accepted practices was due to faulty application will remain for future, and widely extended experiments to determine. Some years ago, a Mr. H. M. Stringfellow of Texas, attracted considerable attention in horticultural circles by promulgating a new system of root pruning fruit trees at time of transplanting. This consisted in pruning off all the side roots close to the main stem, and cutting it also quite short. Mr. Stringfellow supports this practice in a quite unique argument in which he holds that since in nature the plant starts from a seed, we should try to imitate nature, by reducing the tree to as near its original seed condition as possible, and he further contends that the decline in the vigor, and longevity, of American fruit trees which is by certain writers supposed to be continually going on is due to the fact that this principle which he enunciates has not been recognized and practiced before. He reports the system as eminently successful in his section, and the saving in freight bills on trees so pruned, before they leave the nursery and the convenience in planting no one can doubt. The conditions in the part of Texas in which Mr. Stringfellow lives are, however, quite peculiar. The soil is very light, and the climate is subtropical. Some fruit trees are propagated by cuttings, a thing certainly not possible except under such hot bed resembling conditions as there exist.

Because of the questioning in this and other quarters of the common methods of pruning, the experiment of which this is a partial report was inaugurated. There were two points on which it was desired to throw some additional light. First, what length should the roots of apple trees be cut, at the time of transplanting? Second, the relative importance of the roots in relation to their size, that is should the smaller fibrous roots be carefully saved or are they of minor importance?

For the first part of the experiment, the part to determine the proper length to cut roots, thirty-nine Duchess of Oldenburg trees were taken. They were three years old from the graft grown on the station grounds, and were rather large for their age. They were taken from the nursery row on April 14, 1897, great care being taken to remove them with all the roots possible, immediately on coming from the ground they were covered with wet sacks and taken to the cellar when the pruning was done. The spring of "97" was quite late in this section and the trees were perfectly dormant at the time of transplanting. The thirty-nine trees were divided into three lots of thirteen each; each lot being pruned differently. Lot No. 1, had the lateral roots pruned to a length of one foot from main stalk with an eighteen inch tap root. Lot 2, had laterals cut off six inches from main stem, and tap root left one foot long. Lot 3, had all the lateral roots pruned off close to main stem, and the tap root left one foot long. In each lot the top was pruned so as to be in proportion to the amount saved. The next morning after being dug out, the root being kept in the meantime carefully covered with moist soil, the trees were removed to the field, and carefully planted. Of lot 1 and 2 all put out leaves at the regular time (about the first of May) that season and grew well through out the season. Of lot No. 3, only four put out at regular leafing time, two came a month late, four put forth leaves about the 20th of June, and three failed to start at all.

Three trees in each lot were dug up during the summer and examined without disclosing any thing of particular value, and were thrown away. On November 30th the seasons growth being at that time ended, the number of new twigs on each tree were counted and the total seasons growth measured. Lot No. 1, average number twigs per tree twelve; average linear growth per tree nine feet eleven inches. Lot No. 2, average number twigs per tree nine and six tenths, average linear growth per tree seven feet six inches. Of lot No. 3, only five were alive at this time; of the three dug during the summer two were already dead so only six grew out of the thirteen. Of the five left we have the following figures. Average number twigs one, average growth five and four fifths inches. Most of the foliage on this section was in the shape ot rosetts of leaves leaving short spurs when leaves fell. Five trees of each lot were dug just as they came dead or alive extreme care being taken to save all roots, and the trees were then photographed. The first seasons growth shows the trees which were dug with the longest roots made the best growth, and through the three lots the growth was in direct proportion to the amount of roots left on trees at time of transplanting.

Now for growth of second year which was taken the twenty-sixth day of November, 1898. Lot 1 average number twigs 25.4, average growth per tree 40 feet 8 inches. Lot 2, average number twigs 27.8, average growth per tree 41 feet 3 inches. Lot 3, (only 4 trees left) average number twigs 15, average growth per tree 28 feet 10 inches. This year modifies our results considerably; the medium rooted trees have nearly if not quite caught up with the long rooted ones, and what there are left of the short rooted ones are gaining ground. This experiment evidently shows that the injury caused by too close root pruning is one that the trees tend to out grow if they don't die out right.

The medium rooted trees seem to be quite as desirable as the long rooted ones as they now stand. The heroic pruning advised by our southern neighbor seems to be ill-adapted to our conditions. The mortality amongst the trees is far too great. All the speculation in the world as to the csuse of an hypothetical decadence in the vitality of American fruit trees doesn't obviate the fact that a collection of dead sticks is a very poor foundation for an orchard.

For the second part of the experiment to determine if possible the relative importance of the fibrous and larger roots, twenty-two three year old Claytons were taken, all of which had the roots pruned off about six inches from main stem. In addition one half had all the roots under one half inch removed (sized being gauged with a pair of calipers) while in the other half, they were left intact. They were handled similarly to those in the previous experiment, care being taken not to allow the fine roots on those trees, possessing them, to become dry. Of the first half, or those without the small roots removed, all leaved out at regular leafing time, and grew well throughout the season. Of the second half only two put out leaves at regular time, two came three weeks late, four commenced to grow about first of July, and three failed to leaf out at all. Three of the last four put out, died later leaving only five growing of the eleven planted. The present year this experiment was carried further with two year old number one Ben Davis trees. Thirty of these trees were taken and divided into three lots of ten each. The first lot was unpruned, the second had all under one-fourth inch removed. In the first lot all lived, in the second lot one died, in the third lot three died. The early part of the present season was too wet for good growth on our heavy clay soil, and the amount of growth was in no case sufficient to indicate much. The results, however, in connection with those of last year point all in one way. The percentage of trees in each case which survived the transplanting is in direct proportion to the number of small roots saved. There is nothing new or startling in any of these conclusions. They agree in substance with the teachings of all the older accepted horticultural authorities and are not contradictory to those of the later conservative investigators in the north. Over how wide a range they may find application I couldn't presume to say. As was suggested at the beginning of this article the chief difficulty seems to be the tendency in certain quarters to apply the lessons learned under local and abnormal conditions to general practice.

Another point investigated in this experiment, was the amount of benefit derived from the often heard advice to cut the roots so the cut end will rest flat on the ground when placed in the hole for transplanting, that is with a horizontal cut. For this phase of the work twenty-two trees were selected of eleven different varieties, two of each variety. Of each pair one was pruned so the cut surface was horizontal and the other the cut was vertical. They were planted in two parallel rows so each tree was opposite its mate in the other row. Of these trees at the end of the first year eight pairs showed growth nearly equal. In two cases the tree with the vertical pruned roots were slightly in advance of its mate and in one case the horizontal cut root was superior in growth. One pair was dug up at end of first season to see if any essential difference existed in root system, but none was apparent. New roots had started from all parts of the old root and extended in every direction.

The trees remained in the same relative position as regards size. One of the horizontal cut trees died from blight. The advantage, if any exists in giving horizontal pruning is evidently so slight as not to overcome the individual variation of the trees.

N. O. BOOTH, Assistant in Horticulture, Columbia, Mo.

ORCHARDING IN ILLINOIS.

The older part of this orchard was planted about thirty years ago. There was also planted at the same time a pear, peach and cherry orchard; the pear, peach and cherry orchards have long since passed out of existence and been replaced by apple trees. In replacing the cherry orchard a few old snags were left where they did not interfere with the replanting of the apple trees, expecting that they would only live a year or two years at farthest. This part of the orchard has been in constant cultivation and these old cherry snags seemed to take on a new lease of life from the time the cultivators were started, and what is more surprising, have not failed of a good crop of fruit from that year to this and now will have to be removed as they are ruining the apple trees.

After the old original orchard commenced bearing, it was discovered that there were several varieties that would not pay for the use of the ground they occupied and it was determined to grub them out. But removing them by hand proved a slow and costly undertaking; and not only that, but the young tree replanted in its place did not start off and grow as it ought to. It was learned that by taking a common one-and-a-half or two-inch augur and welding on a piece of iron so as to make the whole thing about four feet long, then by boring under the old stump and inserting a half pound stick of dynamite with about eighteen inches or two feet of fuse, that the whole thing could be lifted or loosened, so that a very little extra work would remove the stump, and not only that but it made a hole that took a half load of fresh dirt to fill up, and the young tree replanted in that place would commence to grow from the start, proving that there need be no fear of replanting an old orchard with young trees if dynamite is used to remove the old stumps, providing that the young trees are fed and cultivated as they should be. In removing the unprofitable trees in one part of the orchard, it left three rows of old trees in the center of a block of young trees, so that it was almost impossible to cultivate the young trees without including the old ones. It almost seemed a waste of time to leave these old trees, for they had borne no apples for six or eight years, and what little foliage they put out every spring was small and covered with a smutty looking substance and most of the trees had one or more limbs dead clear back to the main trunk, and a few more than half gone in that way. The first year's cultivation made no difference that season, but the following spirng they put out a set of fair sized, healthy leaves; the following season good foliage and a crop of apples too small for market, and the next two years the crop had to be thinned in order to keep the trees from overbearing.

Before this time the balance of the old orchard had passed its prime, had almost ceased to bear any apples fit for market, and the trees would shed their leaves long before the proper time, going through half the season with bare limbs under a scorching sun, but the green hillsides of Kentucky could not show a finer set of bluegrass than grew under those same old trees. They had not been plowed for ten or twelve years, and the roots were only just under the surface, making it almost impossible to plow, and it was some time before a suitable implement could be found to tear up the sod without injuring too many roots. It is generally supposed that the roots of a tree extend outwardly about as far as the top, but the hired man in this orchard proved that to be a wrong theory. Some of the long slender roots were traced twenty to twenty-five feet from the main body, and the end was not reached even at that distance. These trees did not show any of the effects of cultivation the first year, except to hold their foliage later, but the second season they came out with a healthy set of foliage, that stayed on all the season, and bore a good crop of apples.

This orchard has been sprayed for a number of years, but with such varying success that the owner was almost discouraged and thought he would have to give it up. Commencing with water and Paris green simply as an insecticide, he had gradually drifted into the more complicated Bordeaux and Paris green mixture, used both at one time as an insecticide and fungicide; for it seemed a waste of time to go through all the motions for only half the work. If you are spraying for the apple worm why not add the Bordeaux mixture and spray for the scab at the same time? The spraying of this orchard has had for the owner all the facination of the game to the young gambler. The successes to the close observer have been just enough to show that if we only knew how and when and where to use the spray that we would be masters of the situation. The outsiders have seen nothing but the failures. But spraying will never be fashionable until we have a more simple and easier prepared mixture than Bordeaux. Its preparation is too complicated and it is too hard on the pump. So far have found only one pump that was able to stand it for more than one season.

This orchard from being planted on the graves of so many other trees, seemed to have inherited all the insects and diseases of those that had gone before. It was just like some children, seemed to catch everything that was going. There was not an insect pest or fungus disease in the neighborhood but what showed up worse in this orchard than in any other. It was a determined fight between the owner and the pests, with the latter continually getting the best if not all of every crop until he commenced spraying, and even then at times it has been very discouraging. The first sprayings were made only when he had time, for when we were learning the A, B, C of spraying, it was thought any time would do. But by close watching it was discovered that while the spray applied at certain times did good at other times it was useless. Gradually profiting by his own experience and that of others he learned there need be only two sprayings for the apple worm, one just after the blossoms dropped and the other about ten days later.

For some years the early harvest apple in this orchard had been so scabby that they did not pay the expense of shipping, but the first season that they were sprayed with Bordeaux mixture they were as smooth as though they had been polished. For shipment they were sorted into two grades, size being the only difference, leaving five barrels of very small but perfect apples. More for curiosity than any thought of gain, the five barrels were shipped along with the rest, but branded No. 3. The commission man remarked, when he made his returns, that by keeping back the small apples until he closed out the others, they sold for almost as much as the larger size, they were so perfect.

Previous to the year of 1896 the spraying of the orchard was not systematized as to time and number of sprayings. Some years it had been sprayed just as the blossoms fell, sometimes not until the apples had formed, and then other times not until the fruit had reached considerable size. But the season of 1896 it was determined to give it a thorough spraying just as the "books" called for. A tank holding 300 gallons was made at considerable expense, and the orchard was given its first spraying before the blossoms opened, another just as they fell, another a week or ten days later and another one still later, with the result that during the season it showed up with a crop of the wormiest lot of apples in that section of the country. The trees were full of apples and still there were not enough to furnish each worm with a home of its own. It is claimed that the moth lays its eggs in the maturing blossom of the apple just as the petals fall, and as soon as the caterpillar hatches it burrows into the apple. But this orchard that season must have developed a different breed of worms, for they not only burrowed through the blossom end, but the sides as well, literally turning these apples into city flats. At gathering time these apples contained no worms. But they could not be classed as No. 1, although perfect in form, size and color; they were very solid, showed no signs of rot, just simply the holes. In examining the fruit along through the growing season by cutting it open, it was found that the worms were all dead. A neighboring grower, who had observed the same thing, remarked that they were all drowned as the holes were full of water.

In the spring of 1896 we commenced spraying May 10th, and as the last year had been so disastrous, the spray was made stronger by adding three eighths of a pound of paris green to fifty gallons of water instead of one fourth of a pound as formerly, and each tree was sprayed until it dripped. Owing to the extra time it took to do such thorough work, and also bothered by frequent rains, did not get through first spraying until May 25th. The second spraying was abandoned. Shortly after that time the orchard showed up with the snarliest, most lopsided, uneven lot of apples it had ever borne. It would have been hard to find a more disgusted fruit grower than the owner—almost ready to turn the whole thing out to the commons. But the cutaway, the acme and the smoothing harrow were kept going in that part of the orchard that had been cultivated the year before, working it up so that all through the drougth of that year it had from two to three inches of dust on top, with plenty of moisture underneath. Right in the hottest and dryest part of the season, it was noticed that the apples on the cultivated part were improving, and they kept on swelling and getting smoother and smoother until gathering time, which resulted in an extra good crop of apples free from worms. In that part of the orchard that had not been cultivated the apples showed no improvement, and were hardly worth gathering, even in that year of exceptionally good prices. The trees and soil were identically the same, nothing but a portable fence separating them, only one part was cultivated and the other was not.

In the spring of 1898 commenced spraying April 1, before the leaves started, and finished April 9, but it only took four days of that time to go over the orchard, the balance of the time it was raining or freezing. Commenced spraying the second time just after the blossoms dropped, May 13, and finished third and last time, June 6. Cold, nasty rains almost every day, but as this is ideal weather for the scab to develop, kept the pumps going steady, when it was not actually raining, and this fall gathered as fine a crop of apples as any one would wish to see.

The spring of 1896 apple trees commenced blooming April 21 and had dropped their blooms by April 25. Clear, bright sunshine with no wind.

The spring of 1897 everything commenced blooming April 25, but was not in full bloom until April 29, then four cold, cloudy, rainy days, ending with a heavy white frost; last blossoms gone by May 9; last four days bright, clear sunshine and no wind.

The spring of 1898 apple trees commenced blooming April 27; commenced dropping May 4; then four days of cold, nasty rain; blooms all gone May 12; last four days warm, pleasant weather.

This orchard bloomed very sparingly this last spring in comparison with other neighboring orchards, and the remark was made several times by good fruit men that there would be no apples in this orchard.

It will be noticed that the weather of 1897 and 1898 at blooming time was almost identically the same, with the exception that in 1897 there was a heavy white frost. There is no doubt but that where the frost struck the bloom it made snarly, lopsided fruit but no failure. Then what caused the failure of 1898? It is claimed that owing to so many cold, cloudy, rainy days at blooming time, that the bees and other insects could not pollenize the blossoms and that the apples failed to set. But close examination of this and neighboring orchards at that time prove that they did set and set full and that the fruit reached the size of peas and then it disappeared from neighboring orchards as if by magic. Every observant apple grower knows that we have just passed through one of the worst seasons for scab and other fungi diseases that the West has ever known. May we not venture the point that some of the blooms and fruit may have been blasted by this same fungi? Sometimes we may not actually know a thing but we can have a mighty strong suspicion.

It has generally been considered a fortunate orchard that has a timber wind-break on the west and northwest. This orchard is so situated, but there has occurred the loss of two crops of apples in this orchard by late spring frosts, just on account of this same wind-break allowing the cold, still air to settle in behind the timber. But there were many times when it was a real benefit by allowing spraying to be carried and by reducing the number of windfalls during windy weather or during a heavy storm, and also preventing the breaking of trees when loaded with fruit or ice.

In the observation and care of this orchard the owner has learned that in cultivating an orchard it is not necessary to plow as though you were going to plant corn or potatoes. The object is simply to keep the soil mellow on top. That the cultivation must be done early, as trees complete their growth mostly by the first half of July. Never start in to cultivate an orchard after mid-summer. That the fruit in that part of the orchard that is cultivated does not ripen as early and is not as highly colored as in the uncultivated part, but is more solid, heavier in weight and will keep longer. That a certain set of iron clad rules will not do for every orchard or every season. That while we can not alter seasons we can alter or modify conditions. That a close observer in a certain orchard will develop methods and results unconsciously, but that he can rarely impart this particular information to his neigebors, and if he could it might not fit their situation. There are certain problems that each fruit grower must pick and solve for himself and if he can not do it he must give place on the ladder to the one who can.

H. A. Aldrich, Neoga, Ill.

REMARK.

Mr. Aldrich.—After several years of spraying with but uncertain results I kept looking over my orchard to see if I could find out the reason of my want of success. On one side of the orchard were two rows of Trancendent Crabs. These were not sprayed and the fruit was not gathered, but left to rot on the ground. It struck me that these crab trees might be the means of spreading scab and other fungus diseases, so I cut down these trees and burned them and kept on spraying the orchard as before. There were no more wormy or scabby apples in that orchard.

APPLE GROWING. VARIETIES TO PLANT, HOW TO PLANT AND WHEN.

Mr. President, Ladies and Gentlemen:—When our worthy secretary asked me to prepare a paper for this meeting, the thought occurred to me that if he knew what he was about to inflict upon this people he would never have asked for the paper, and I hardly think he will make such a mistake again (in my case at least).

I have chosen for my subject, Apple Growing, Varieties to plant, How to plant, and When. I feel very incompetent to handle the subject as it should be and it is with some misgivings that I stand before this audience, composed in part, at least, of men grown gray in the art of horticulture, to tell you what to plant, how and when. In planting an orchard the varieties to plant form an important factor in the future success of that orchard and I do not believe it will do to name a list of varieties and say they would do for all parts of the country, as we find some varieties succeed in one locality and are almost a total failure in others. I have always found it advisable to look around me before purchasing my trees and see what varieties succeed best in my immediate neighborhood and then purchase those varieties of some reliable nursery, and will say it is not the nursery company that grows the largest number of trees and makes the most noise about it that will sell you good trees the cheapest, nor are they the most careful to have them true to name, and if not true to name, your orchard is a failure and your money, time and labor are lost. For a family orchard, plant from the earliest to the latest varieties only planting enough of the summer and fall varieties to supply the family. Also plant so as to have a succession. I would name for a family orchard, Early Harvest, Yellow Transparent, Red June, Duchess Oldenberg, Maiden Blush, Rambo, Grimes Golden, Jonathan, M. B. Twig, Ben Davis, and Jeneton, only planting a few each of the summer varieties.

While there are other good kinds, I do not think this list can be improved on for north east Missouri and will succeed over as wide a territory as any that can be named. For a commercial orchard I should only plant varieties that are known to be early and abundant bearers of good large apples that keep and ship well. For north Missouri would plant at least fifty per cent Ben Davis, notwithstanding the fact that a great many are crying old Ben down. I am certain that the Ben Davis will make more money in a given length of time than any other variety. Plant the balance to M. B. Twig, York Imperial, and Jonathan and let twenty-five per cent be M. B. Twig. I believe this a good list for most any part of the state, except the Jonathan might be too early in the south part.

I expect to be criticised for advising to plant so many Ben Davis, but if you want something to bank on, plant them and you will succeed without a doubt.

How to Plant. First choose a good piece of ground, one that would produce thirty to forty bushel of corn per acre, plow it good and deep in the fall before wanting to plant in the spring. Have read a great deal about subsoiling and think perhaps where there is a heavy clay subsoil it might be advisable but can not speak from experience and my experience is what I am trying to give. In the spring as soon as the trees arrive unpack and heel in near the place of planting first cutting off any bruised or broken roots and then puddle the roots and they are in shape to heel in. Have found it a good plan to repuddle at time of setting. In the spring of 1895 I set out 1000 trees handled this way and all grew fine and are nearly all alive to-day. As soon as the ground is dry enough to work well plow a furrow where you want the row of trees to stand, going two rounds to each row, running the plow as deep as possible thus breaking up the subsoil and forming a drain under the trees and it only leaves a small amount of dirt to throw out with the shovel. It would save some time if in plowing the ground in the fall you would lay off the ground in lands twenty-five or thirty feet wide, then in the spring set the plow as deep as possible and go one round in each dead furrow. It is very foolish to take the advise to "dig a hole three feet square and two feet deep;" all that is necessary is a hole large enough to admit the roots without bending and deep enough to set the tree only a little deeper than it stood in the nursery row.

I am sure a great many trees are ruined by being set too deep. In place of plowing furrows cross ways take a common check wire and tie a knot every twenty-five feet, making it so it can not slip, make a straight line across one end of field and set the anchor in it, draw the wire as tight as for checking corn and set the other anchor. The wire has to be moved for each row of trees and you should be sure and have the wire on the side of tree next to ground to be planted. I believe this the best and quickest way to set trees as it does away with all setting of stakes for cross furrows. After getting a row or two ready take out enough trees to set them, puddle the roots by dipping them in a thin mud made of good soil, load on a sled and cover with a blanket to keep from drying out, for if the mud dries on, it is worse than if they had never been puddled. Drive between the rows to be planted letting two men walk on each side of sled, one man to take out the trees and hold them in position and work the dirt around the roots and tramp it down hard except a few inches on top, the other man should have a small amount of dirt thrown in the center of hole, in shape of a cone, to set trees on so the roots will point down. Incline the tree a little to the southwest as the wind will in a few years bring them to a straight position and if set straight they will lean to the northeast before the end of the first year and then they will sunscald. This applies to northeast Missouri, and perhaps in other sections the prevailing winds might be from another direction and then the trees need inclining towards the prevailing wind.

Fill the hole up using top soil in the bottom firming it good with a tamp stick or your feet, filling the hole a little more than full, as it will settle some. Perhaps some may think this a great deal of work but if you wish to succeed you must take pains, and a little work in the beginning will save a great many trees and much loss and disappointment.

When to plant. Next spring if possible as a year lost can never be regained. I notice a great many advise planting in the fall and their advise might be good for some kinds of soil but for north Missouri it is anything but good. I have had trees that had grown all summer, lifted almost out of the ground by the alternate freezing and thawing of the following winter and spring. What do you suppose would have been the result had the trees been planted in the fall and no chance to get a good hold on the ground? Let me tell you a great many would have been lifted out and frozen to death, the balance so near dead that they would never recover. If you have a sandy soil it might be well to plant in the fall, otherwise not. I imagine I see some of the old veterans smile at the idea of a young man giving them advice, but I have proven these things and I know whereof I speak, besides it is more to the young men here that I speak and hope to save them from shipwreck on some of the rocks mentioned, among which, is fall planting. Now friends you have the orchard planted, don't leave it for the weeds to take, mice and rabbits to girdle and borers to destroy. Cultivate well, and well means often for the first two years. And it must not cease then, but be kept up as long as you expect the orchard to be profitable. Look for borers every August and September and again in the spring as some will be overlooked and would ruin the tree before the next fall. Protected from rabbits and mice with screen wire or veneer wrappers, putting them on as early as the first of October. Trees thus treated will be a thing of beauty and a joy for years.

Friends, experience teaches a good school but sometimes it is expensive and it is well to profit by the experience of others, and I know of no way to get it equal to becoming a member of the State Horticultural Society and then attend the meetings, also take two or three good horticultural papers and read them. What I have written may not be new, but I find people all over north Missouri making great mistakes in planting their orchards, and trust these thoughts may help others to avoid making mistakes in planting theirs. J. E. MAY, Wilson, Mo.

DISCUSSION ON APPLE GROWING.

Mr. Butterfield:—I will say that I would never have planted an orchard in Missouri had it not been for the discovery of spraying as a means of fighting insects and fungus diseases. These pests were becoming so numerous that I was afraid to undertake it. I was talking of the matter with a man from New York, and he said "Don't let insects deter you from planting orchards; spray your trees." I followed his advice and I know it has been successful. Mr. Bayles of our county has large orchards. He has been using an Evans sprayer for three years. Last year he had a large crop worth $65,000. He sprayed this year, and had apples; and he was the only man that had apples this year in that locality. I think if we will spray thoroughly and wisely we will raise apples. As to what to spray with, I am inclined to the white arsenic. I think Mr. Bayles sprayed with Paris green. He is a thorough man; gets the pure article, regardless of cost and does the work well.

Mr. A. Nelson read the following letter:

WALWORTH, N. Y., Nov. 18, 1898.

MY DEAR MR. NELSON:—We have not tested the Worden Seckel as much as we would like to do before expressing a very decided opinion of its merits.

We have some grafts in bearing, and had about one-half bushel of fruit this season, but by mistake the men mixed them in with Seckel and they were sold before we were aware of it. S. & P. Co. sent us a basket two years ago. We thought them nice, but not nearly equal in *quality* to the Seckel and so wrote them. Our T. G. Yeomans says in flavor it resembles a Flemish Beauty as nearly as it does a Seckel. It is a good grower so far as our grafts are concerned.

We are not familiar with the Champion peach, but have the Crosby in bearing. We like it. It resembles in appearance very closely what we used to call the "Barnard or Pine Apple"—one of the very best flavored peaches for canning because of its superior flavor. We think the Crosby blooms late, and is hardy. We will try it further, but all things considered, we have found none equal to the Crawfords for us. The Elberta, with us is fine, but it is ever subject to the curl leaf, which almost ruined the peach crop here, when the trees had not been thoroughly sprayed with Bordeaux. We sprayed all of our peach orchard three times with Bordeaux, and had a splendid crop of fruit, but at home in our gardens, where we did not think it worth while to spray, we lost the crop from the curl leaf. We are compelled to spray for everything, and I suppose you will have to do so some day. It cost us about $800 the past spring to spray our orchards, but as the result we had about 365 barrels of very choice orange quinces, and about one third of a full crop of apples (about 19,000 bushels) while those here who did not spray had very few—some not enough for their own use—those who sprayed had fruit, and the more thorough the spraying, the larger the crop. We barrelled the choicest—1,600 barrels, and the balance we are working up in our evaporator. As high as fifty cents per bushel has been paid for an entire orchard here for evaporating most of the fruit being shaken off, but that is an extreme price—about 35 to 40 was the more common price. Your state did it up proud at Omaha in the fruit line, and I congratulate you on your part which I suspect was not a very small part in the work. The cions you sent are growing finely, but you can beat us on growth. Your truly, L. T. YEOMANS.

Mr. Tippin:—I spent three months this last season in New York and southern Canada. I will not now speak of the proper time to spray or of the substance to spray with. What I want to say now is that the effect of spraying and cultivation was undoubted success. In western New York they had a half crop; but invariably the orchards in grass (and a large per cent of them were in grass) that were not sprayed, were practically worthless and had it not been for the short crop of apples, so that people were willing to pay for a lot of stuff they would not ordinarily have been picked from the ground. Sprayed orchards had a very fair crop. I bought over 7,000 bushels of apples.

Question:—What did you pay for them?

Mr. Tippin:—That is a leading question at this time. The growers made more clear dollars than they ever did before. There is no question but that we have got to spray and cultivate, I do not say when or how. I will cite one instance in New York. One man labored with $8,000 debt. He had four thousand apple trees. This year he had four thousand barrels of apples at $2.25 per barrel, in the orchard; and the debt was paid. Another man started with $11,000 debt twenty-two years ago. This year he had one thousand barrels at $2.25, and he finished paying this debt. Most of their orchards are old, from fifteen to fifty or seventy-five years old.

Mr. Nelson:—Many of the orchards in New York are fifty to sixty years old and they are going out.

IDEAS IN ORCHARDING.

The first idea I have to offer you is that orcharding in Missouri pays better than any other line of farming. I have been trying to do some missionary work in my county and have tried to meet the objections that are raised against the business. One says it is too slow. It is true that it seems a long time to wait in this fast age but we should remember that we can have about as good returns from our land while we wait as if the trees were not there. Another says it requires too much care and is too uncertain. I admit that they do require care, but not more than is required to grow other crops. As to the uncertainty of the crop, we have off years in all products. I don't know of a single farm product that is grown in the State but what fails sometimes. Another says there are too many that go into it and fail. I don't think there is as large a per cent of failures in orcharding as most other callings. Look at the failures among merchants, mechanics, lawyers, doctors, teachers and preachers. Even bankers and politicians sometimes fail. I am sure that the same amount of intelligent effort that is required to succeed in other callings will succeed in orcharding. Another says the business will soon be over done. Well, I have heard that all my life. When I planted my first apple trees (200) in 1868, I was told by one of my best friends that I was playing the fool. "Why," said he, "by the time they come in bearing apples will not be worth ten cents a bushel." They were then worth about twenty-five cents, in an average year. There has never been a year since then that good sound winter apples were not worth twenty-five cents in the fall, and some years three times that. The demand has increased faster than the supply. The area that will produce good winter apples is so limited and our market so wide that we should devote vastly more of our land to orchards. I would be glad to see five to ten acres of orchard on every farm in my county. My idea is that it does not require an expert or specialist to grow fruit in Missouri. Scientific knowledge is all right, and the more of it the better, but if we have not got it we should not wait to learn all about the business but plant out the orchard and then learn all we can as we go along. I will give a few ideas that I have learned by experience.

In most every thing we should avoid extremes. Land for an orchard should not be too rich nor too poor. Trees should not be set too wide nor too close; two square rods is ground enough for an apple tree; that is eighty to the acre. Trees to set should be young and thrifty; head them medium, cultivate well, but never late in the fall. Prune out all cross branches, and to keep the tree balanced, prune any time, but never very heavy at a time. Protect from rabbits and keep out borers. Don't plant many varieties in a commercial orchard; plant what is known to succeed best in your locality. Your varieties must be good bearers and good sellers. I have an idea that an average farmer can take care of a five acre orchard and do about the same amount of other farming that he would do without it. Another idea, if you do set out an orchard, don't forget it.

B. R. Boucher, Cairo, Mo.

DISCUSSION ON SPRAYING.

Mr. Chandler:—I have never had a borer in my orchard, except one, and I brought that from the nursery. In other places not far away they have these insects. In driving over the country in summer I have noticed that in some localities you would find horseflies, or mosquitoes, and in other places there would be none. Perhaps it is the same way with borers; some localities may be exempt. I live in St. Francios county, about ninety miles south of St. Louis.

Prof. Taft, of Michigan:—For ten years I have been experimenting in the way of cultivating and spraying in Southern Michigan and I am well convinced of the benefits of both. Trees twenty-five years old in Southern Michigan, with little care or cultivation, during the last ten years have made only three crops of poor quality. Other trees, no better than the first, properly sprayed and cultivated, have not failed to give good crops in the past ten years. I think in some cases the scab fungus injures the flowers in orchaads not sprayed, so they fail to set a crop, while sprayed orchards in the vicinity give good crops. I think spraying before the blossoms are open of the utmost importance. With us the canker worm is bad. We have used arsenic in preference to Paris green, with fully as good results. It costs about one third as much as Paris green, which is only one half arsenic, thus making the green six times as expensive as the white arsenic. With us the Northern Spy and Fameuse can be successfully grown only by spraying.

Mr. Van Deman:—Spraying is insurance. You do not expect your house to burn down every year, but to be safe you keep it insured. Insects and diseases may not take your fruit crop every year, but they will come, and you must be ready for them. It is only reasonable to care for the orchard if you would have good crops. A large part of the growers will not spray, and this will be true, even fifty years from now. This very fact insures the careful, painstaking cultivator pay for his labor. In Western New York the old orchards are neglected. It is the bane of all these orchards. Western growers are better cultivators than the Eastern. In California and Colorado they cultivate better than you do here in Missouri.

I have in mind a Virginia orchard of forty acres of Newtown Pipin. About ten years ago I began to talk spraying to the owner, and I finally got him to spray ten acres of the orchard. He got more than twice the amount of fruit from the ten acres than from the thirty and he did not half do the work. In some cases spraying has not apparently paid. The time of spraying is very important. We must spray early. Last year at the Penn Yan, New York, institute the point was brought out very clearly that spraying before the buds open in the spring was of the most importance. In their vineyards they sprayed the vines, trellis and posts; and burned all the trash and prunings, so there was nothing to carry the disease over. About spraying machines, I have no interest in any machine. There is a great difference in them; some of them will do good work.

Mr. Aldrich:—I have no personal experience in spraying for the San Jose scale. We have the scale in some parts of Illinois. One orchard of fifteen hundred Kieffer pears is infected. The owner cut out one hundred of the trees. Prof. Forbes sprayed that orchard last year with the whale oil soap solution. It required very close inspection this year to find any remaining scale on the trees; only one hundred being very slightly infected. The owner had the best crop of pears this year he ever had. It has become the general opinion in Illinois that we need not greatly fear the San Jose scale.

Prof. Stedman:—There is nothing to compare with whale oil soap as a remedy for the San Jose scale. It seems to be practically the only thing. It must be applied in the winter as it injures the foliage in summer. The scale has not spread much in this state. There is very little of it in the state; but the orchards in which it was found are still infested. Very little is being done to get rid of it. Spraying with whale oil soap is rather expensive, and the people neglect it. I see only one way to fight it, and that is to pass a State law to enforce its destruction.

Question:—Will iron filings color fruit?

Prof. J. C. Whitten:—We have experimented with iron to color fruit, but with no very decisive or positive results.

J. C. Evans:—Is it possible for a peach tree to bear fruit when the bloom was hard frozen just before opening, and if it should bear a crop will the seed be fertile?

Prof. Taft:—Though the peach is quite tender it sometimes stands freezing better than the plum or cherry. So far as the ovule is concerned it may be frozen and not be killed.

Prof. Whitten:—I have known frozen buds to produce fruit sometimes.

J. C. Evans:—I have in mind a peach orchard of one hundred acres of one variety. Last spring when the freeze came the buds that were open were killed. Those not open were frozen so severely that the petals and stamens were killed. Is it possible for peaches to make a crop when all the outer envelopes of the ovule are killed? I want these scientists to answer this question. These trees in the orchard of which I speak did not bloom at all.

Prof. Whitten:—If the trees set fruit there is no reason for believing the ovules were not fertilized. In some orchards of fine peaches there are many imperfect seeds.

L. A. Goodman:—These trees never bloomed, though they bore a full crop. The ovule is ordinarily the most tender part of the flower. In this case the ovule survived while all the other parts of the flower were killed. I never saw anything like it before. If I should be asked my opinion of such a case I should say the seeds would be sterile.

Mr. Van Deman:—The fertility of the seed would depend upon whether the seed were pollenized. Where there is no pollen there can be no fertile seed.

Mr. Goodman:—In this case the flower was frozen off.

Prof. Waite (Washington, D. C.)—The pollen was probably not really killed as the male element in the blossom is the hardiest.

Mr. Van Deman:—Some peaches pollenize themselves before the flower is open. Such peaches reproduce themselves from seed. The Heath Cling is an example. Some times we have fruits with no seeds in them at all, such as the Japanese persimmons, bananas and navel oranges.

J. C. Evans:—I was asked if I was sure that the ovules were not pollenized. We are not sure of anything in nature. Her ways are very mysterious.

Mr. Barnes' of Kansas:—Mr. Wellhouse used to say that peaches, which reproduce themselves, are pollenized before the blossoms are open.

Professor Taft:—I have noticed that peach blossoms open several days were not killed, while those open one day were lost.

J. C. Evans:—In many cases the seed of fine fruit will not grow. About four per cent of the seeds in the orchard of which I speak, were perfect. In this case whether that is a reasonable per cent for a common year, I don't know. The variety is Elberta. Where they were least advanced I find a few seeds that were perfect, and will grow. I would say these blossoms were never fertilized, yet we have perfect seeds in that orchard.

Professor Whitten:—Peaches of the Chinese strain are often pollenized before the blossoms open. Last spring, in crossing peaches, we found many flowers pollenized before the bud was open. I thought the flowers in the case under discussion might have been pollenized before the flowers were open.

QUESTION BOX.

How shall we educate the people to buy fruit by quality, rather than appearance?

Secretary Goodman:—I think it is unnecessary to educate them. If they will buy such apples as the Ben Davis, and pay us as much for them as for Winesap, or White Winter Pearmain, it is better for the grower. To many people, the Ben Davis is a good apple. Why should we educate them on this point? The greater number of the people who want apples, are not so very particular as to quality, like you horticulturists.

What is the best protection against rabbits?

Secretary Goodman:—The wooden-tree wrapper is the best. I have used many thousands of them, and like them better the more I use them. They cost only $2.50 to $3.00 per thousand. I put them on in the spring when I plant the tree, and leave them on summer and winter, removing them once a year to white wash the trees with lime wash, with carbolic acid and kerosene emulsion in it, putting them back and leaving them on as long as they last. I do not stop the top to keep out the beetle, which lays eggs for the borer.

J. E. May:—I found my trees, which were protected by these wrappers, with two or three borers in many of them.

Mr. E. Lilly:—Do you believe the wash will keep borers out? We wash for this purpose successfully. How does Mr. Goodman compound his wash?

Secretary Goodman:—Use one pint carbolic acid, and two gallons kerosene oil made into an emulsion, to one fifty gallon barrel of wash, useing lime enough to make a wash to be applied with a brush. Use this wash once a year in July or August.

Mr. Barnes:—Judge Wellhouse has never wrapped or in any way protected his trees against rabbits. He catches the rabbits, having three thousand eight hundred box traps. I have known the boys, who tend the traps, to take as many as 115 rabbits on one morning.

Question:—Is grease a good protection?

Answer:—No. Dangerous to use.

Question:—Is the Champion peach of good quality?

Answer:—Yes: the very best.

Question:—What do you know of the Otwell tree paint?

Answer:—Nothing was known of it.

Mr. Van Deman:—Some one spoke of a difference in the variety of the Champion peach; it depends upon the variety of the agent who sells it.

Mr. Murray:—There is no better peach for the orchard than the Champion, to my knowledge.

C. M. Stark:—There is a yellow peach in Michigan called Champion.

Question:—Will concentrated lye effect the quality of Paris green as a poison?

Answer:- No.

WEDNESDAY AFTERNOON.

No session of the society was held on Wednesday afternoon. The time was spent in looking over the State University grounds, buildings, and equipments, under the guidance of President Jesse, Dean Waters of the Agricultural college, Profs. Whitten, Stedman, Mumford and others. In visiting the college buildings and the experiment station and grounds, it was a matter of general surprise to see the amount of work done in experimenting with the very meagre facilities for doing it. Every visitor there was strongly impressed with the great need of a suitable building, thoroughly equipped for the study of the science of Horticulture, Entomology and Botany.

THIRD SESSION.

Wednesday, December 7, 8 p. m.

An unusually large audience numbering about seven hundred assembled for this meeting. President Murray introduced as speaker of evening, Mr. H. E. Van Deman of Parksley, Virginia, who was the first to hold the position of U. S. Pomologist. Prof. Van Deman is a practical man well versed in the best methods of orchard work and acquainted with the fruits of America and the world.

ORCHARDING IN THE WEST.

HOW IT STARTED.

Soon after the close of the Revolutionary war, when the tide of immigration began to surge over the crests of the Blue Ridge and the Alleghanies, my paternal grandfather, one of the seasoned veterans who had served through with Washington from Trenton and Valley Forge to Yorktown, took with him his government land scrip, which was then of uncertain value, and blazed out his claim among the hills of southern Ohio. Here he followed the instincts of his Dutch ancestors, by planting orchards. When I began my rambles about the old homestead, which my father inherited in part, these orchards were yet in full bearing, as I can well remember. My brother and I climbed the great hill back of the house, covered with orchard trees, that to us seemed almost a mountain, and amused ourselves by throwing apples down to see how far and how fast we could make them roll. We drank sweet cider as it gushed from the huge press worked by a horse hitched to a sweep in the old log cider house. As we grew older we climbed the trees and helped to pick the winter apples, and the pears too, and crawled far out upon the branches to shake off those we could not reach. The monster copper kettle that held over fifty gallons was suspended over a big log fire; and we stirred the apple butter, while chunks of half cooked apples swam and bobbed about on top until they finally melted away in the bubbling mass.

My father built flat-boats with his own hands and launched them on the old Scioto river near Chillicothe. He loaded them with flour from the old water mill on the farm, bacon from home raised and fattened hogs, and brandy and boiled cider, which in those days were considered prime necessities, from the three orchards that his father had planted. When the spring floods came he floated these cargoes down the Ohio and from there into the Mississippi, and so on to Natchez, Baton Rouge and New Orleans, which were then the great markets of the west. Some of the apples were sold at neighboring towns and many were given away by the wagon load; the cattle, horses, sheep and hogs ate what they could; and I am sorry to say, very many of them rotted where they fell. This was then considered "Orcharding in the West."

HOW IT GREW.

It is true that many of these old trees were seedlings, but many were not. My grandfather had grafted some of the varieties that are to-day considered standards of excellence, but were then the foremost novelties of the farmer; for there was scarcely then such a personage known as a horticulturist. We had Fall Pippin, Ralls Genet, Roxbury Russet, (which we called Putnam Russet), Westfield and an abundance of that delicious little apple, known then as American Golden Russet, and now called Bullock. We use to sit about the old fireplace in the log house in which I was born and eat whole baskets and pans full of this last named variety; and there is no better known to this day so far as good eating goes, and I doubt if there will ever be a better one. I had an uncle Henry, after whom I was named, who claimed he could eat a peck of Golden Russets at one sitting, and I do not doubt it, for I once saw him eat forty by actual count at his own fireside in one evening.

We had a monster tree of Yellow Bellflower from which I helped gather thirty bushels of selected apples one fall, and many of the best ones we could not get because they were too far out on the branches.

THE OLD ORCHARDS AND THEIR PLANTERS ARE GONE.

But these old orchards are all gone, or about so. Seven apple trees and one pear tree remain of the largest orchard; and five trees mark the place where another stood. They, and many others like them, scattered over what we now call the Central States are relics of what were once the pioneer orchards of the west. Their fruit now drops upon the ground and lies uncared for, while the hands that placed their roots in the virgin soil and anxiously tended them while waiting for their first fruitage lie in the old church yards hardby. Even the younger ones who sat about the old hearthstones, lighted up with bright wood fires that dimmed the tallow candles burning on the mantles above, and listened to their elders telling hunting stories and witty jokes, are, many of them, with us no more. Some sleep in patriots graves. And some, worn out with the peaceful strife of useful lives, lie meekly and modestly, just as they lived. Others are yet in active life. A few are laboring in far-away mission fields. The halls of Congress resound with the eloquence and wisdom of some whom I know. The Great West claim some as among her best citizens. And verily, all of us are marching towards the final destinies of this life and also of that beyond.

A NEW WEST AND NEW ORCHARDS.

From these old time improvements now almost forgotten, the tide of immigration swept on westward, until the great prairies were dotted with orchards; and then crept up the mountain slopes and over into the delectable valleys of the Pacific coast. As I stood a few years ago in an orchard near Salida, Colorado, 7100 feet above sea level, and nearly upon the crest of the continental divide, I was amazed at the scene before me. There in a little valley surrounded on all sides by mountain peaks, and at that great elevation was an orchard loaded with brilliantly colored and delicious apples and pears. In the spacious valleys of Oregon, California and Washington, to say nothing of similar ones in Arizona, New Mexico, Colorado, Utah, and Idaho, there are orchards of which the people of the far eastern states can scarcely imagine the extent and fruitfulness. They seem to the traveler as if the Garden of Eden had once been there and that the curse of God and the deluge had never reached that fair land.

THE APPLE BIN OF AMERICA.

The great Mississippi Basin has been fittingly called the grainary of America, and it is the apple bin as well. The state of Missouri is plainly within the central portion of the great fruit region of the middle west. And, let me say, without any feeling akin to flattery, that there is perhaps no other state in the union which is so universally adapted to orcharding. There may be, and probably are, some portions of other states which have better natural advantages for orchard purposes, but taken as a whole, what state can do or has done better on the same area, or even as well? Facts speak for themselves. In 1897 the fruit crop of Missouri put into the pockets of those who grew it over $19,000,000; and the principal part of it was paid for apples and peaches. It was almost like so much water sold off the farms for so much clean cash; for, when we compare fruit with other farm crops, it is found to be nearly all water. Had it not been for the apple crop that year in Missouri and adjoining states, there would have been very little for home use in the east, and our export trade in fresh fruit would have been almost nothing.

The winter apple crop is Missouri's stronghold in fruit growing. The large size and brilliant coloring of the fruit, combined with its good flavor and keeping qualities make it desireable both at home and abroad. The apple dealers from all the great markets send their agents to Missouri to buy. Her apples are already known in Europe, and the time will come, when, as my good friend, Evans, of the Olden Fruit Farm, once said to me as we were walking through the orchards there, "whole trains will be loaded with apples here and run through to the coast for shipment to Europe." So it may be in other parts of the State.

OTHER ORCHARD FRUITS.

The peach crop of Missouri is a factor in the markets of the country that is felt east and west. There are no better peaches grown anywhere in all America, from ocean to ocean and from lakes to gulf than those of southern Missouri. Some may be a little larger and more showy, but none are better in quality. In time I believe the Ozark country will be almost as celebrated for big red cheeked peaches as for big red apples.

Although the pear crop of Missouri and neighboring states has never been talked about very much it is considerable. The blight at present is the greatest drawback; but the time may come when by conserted and intelligent action, even this dread malady will be brought under control.

The American and Japanese types of plums and the sour classes of cherries are well suited to the climate and soil of the Western states, and Missouri among them. Some of the best quinces I ever saw came from this region. All of these fruits have their disadvantages and enemies, not excepting the apple, but with reasonable judgment, thorough culture and good general care in the orchard, there is no valid reason why tree fruits may not continue to yield abundant crops and go on increasing in profit to those who own them.

THE FAMILY ORCHARD.

The commercial orchardists of to-day are generally able to plan their orchards quite well. The varieties they select are usually the best ones for their purposes, but the farmer who plants for home use is not so apt to know what is best to do in this respect. He usually plants too many summer and fall apples and too many of a kind. In a family orchard there should be a much larger number of varieties than in one planted for market. A succession of varieties that will afford a constant supply from early to late of apples, pears, peaches, plums, and cherries should be planted in every homestead. One or two trees each of ten or twelve choice summer and fall varieties of apples is enough. Of the winter kinds more of each would be needed. Only the very best of the class of fruits should be planted for home use; although they may not always be the most attractive and productive. Nothing is too good for the farmer and his family.

CULTIVATE AND FERTILIZE.

Plowing and cultivating thoroughly will cause a wonderful improvement. Cow peas sowed broadcast or drilled in about June and worked into the ground the next spring will do many times more good than they cost. A good coat of manure will not improve the soil more than a good crop of cow peas. When the peas are full grown in the fall hogs may be allowed to feed them down, for they will get an abundance of food that has cost almost nothing, and do no harm, unless too many are put upon the ground. The principal part of the fertility in the cow pea plant is in its roots, stems and leaves. These should never be removed from the land, but plowed under to add humus and fertility to the soil; unless fed to stock and the manure is hauled out and spread on the land. Clover is a good crop for the orchard, but it should never be made into hay and sold off the farm. One of the easiest ways to manage clover in the orchard is to run the stalk cutter over it when it is fully ripe, thus cutting it and all weeds that may have grown up, into small pieces. This acts as a mulch and gradually rots, whether plowed under or not. Plowing under is thought by some very successful orchardists to be unnecessary. The great apple king, Mr. Wellhouse of Kansas, depends largely on this clover mulch in his bearing orchards instead of plowing and cultivating. Notwithstanding the opinions of such good men it is my belief, based upon very many observations in many parts of the West as well as East, that cultivation is the wiser and safer plan in nearly all cases.

Tillage is fertillity in a sense, because it helps to unlock the latent elements of the soil; and that leads us to ask ourselves "What are the elements of fertility?" They are chiefly nitrogen, phosphoric acid, potash. Nitrogen is a gas which constitutes a large part of the bulk of the air. In combination with other elements it becomes a manure in the soil, and has a most quickening effect upon all growing vegetation. It is one of the most valuable parts of all our home made manures, and is the most costly part of all commercial fertilizers. Some plants have the peculiar ability of absorbing free nitrogen from the air and fixing it in their roots and stems. When these decay they become valuable manure. This is the secret of the great benefit of the clovers, cow peas, etc., to the soil, aside from the humus they make. Nitrogen induces a very succulent growth, and the fruit grower may get too much of it in his soil for the good of the trees.

Phosphoric acid is a compound which plays an important part in the life of all plants and trees. Grains and fruit seeds abound in it. Animal bones are full of it. That is chiefly why ground bone is of so much value to the farmer and fruit grower. The same is true of disolved phosphate rock, which is partly composed of bones of prehistoric animals. Wood ashes also contain some of it.

Potash is another mineral compound that is of great value to the farmer and fruit grower. It has been called the backbone of all measures, used by the fruit grower whether homemade or commercial. It gives the trees vigor and to the fruit large size, high color and good flavor. No manure of any kind that does not contain a considerable portion of it is fit for the orchard. Wood ashes contain it, but the great source of our potash supply is in the mines of Germany. It is found there in such quantities and so nearly exclusively there in a natural form that nearly the whole civilized world is supplied from these mines.

It is not pure potash, but is mixed with other earthly materials of which common salt is one of the leading parts. Muriate of potash, which is one of the cheapest and best manures for orchard crops, and all others too, is about half and half salt and potash. Kali has only about twelve per cent potash, but is well worth its cost to the farmer and fruit grower. Sulphate of potash is another form or mixture that has a high manurial value. Whatever single or combined manures we use, our orchards should be rich in potash. The soil naturally contains large quantities of all these manurial elements, but very often they need supplementing. This is very largely the reason we save and haul out our barnyard manures; that is, for the nitrogen, phosphoric acid and potash they contain.

GIVE THE TREES ROOM.

There are some things which we might consider as common dangers that beset the western orchardist and that are perhaps but little thought of by them. Among them is the crowding of the trees. When an orchard is planted we are apt to think the trees so far apart that they will scarcely ever need all the space allowed them. They seem so little and so far apart. As they grow older their limbs begin to interlock before we realize it. It may not be thought true, nevertheless it is so, that the roots interlock long before the branches do. The poorer the soil the farther they have to go for the moisture and food that the tree needs and must have if it is to grow and bear as it should. An apple tree in full bearing needs more space than an average forest tree. All kinds of fruit trees need more than they commonly get. Crowding is one of the crying evils of the older orchards in the east, and it is becoming far too common in the west. I know of some very large western orchards that are now suffering from this cause.

Pruning off the dead and feeble branches does little good. What they want is more room. Use the ax at the roots of the trees instead of among their branches. In some cases they may be too far gone to be materially helped in this way. But most of them would be greatly benefited by the removal of half or three fourths of their number.

FINAL SUGGESTIONS.

Finally, my fellow horticulturists, let me say to you, that, as one whose lot has been to have had more experience with the troubles of western orcharding than with its triumphs, (for I spent nearly twenty years pioneering in Kansas), and as one who has the deepest interest and the utmost faith in your prosperity, *be encouraged.* But do not expect to blunder into success. Get into your heads the fundamental principles that underlie the business in all its details. Try to know the whys and wherefores of the location, planting and culture of an orchard, of whatever kind it may be. Plan to have something good and plenty of it, *for the homefolks.* Have so much good fruit at home that your children will have no desire to steal from the neighbor's orchards. Have honest principles in the heart as well as sensible notions in the head when you undertake to pack the proceeds of your forethought and toil into barrels and boxes. Give your customers as much water and sunshine and as few seeds and skins as possible. Believe in your calling. Do not trouble yourself so much about the competition of the other fellow as to make him feel troubled about yours. Be sure that there will always be a *good* demand for *good* fruit of all kinds and a *poor* demand for that which is *poor.*

H. E. VAN DEMAN, Parksley, Va.

Recitation by Miss Dix of Jefferson City, a student in the Agricultural College.

The music for the evening was furnished by students from Christian College.

The first number was a vocal solo by Miss Allen.

THE MISSION OF FLOWERS.

There is a beautiful legend, which comes to us from the Orient, to the effect that in the pronunciation of the Edenic curse three things were exempted, the stars, the birds, and the flowers. Whether or not our Occidental minds can entertain this eastern legend, it would be difficult to believe that the stately lily of the lost Paradise, or the gorgeous rose which nodded a first friendly greeting to our progenitress Eve, could have been fairer to look upon than those beautiful descendants which blossomed in your own garden a few weeks ago. However wisely philosopher may descant upon the fall of man, no one has ever yet ventured to discuss the demoralization of flowers, so we may cherish the thought that in flowers we have an unspoiled remnant of Paradise.

Do we ever consider that from a purely utilitarian standpoint God might have created the world without flowers? Man might have been fed, clothed, sheltered and educated, lived up to the requirements of the moral law, even been amenable to the Christain code, without ever having seen the beauty of a blossom or inhaled its fragrance. In no one thing is God's tenderness for his children more strongly shown than that throughout this wonderful world he has furnished countless instances of beauty upon which man's artistic nature may feed and grow. In the primeval forests which offered means of shelter and of fuel, the pioneer also found the blooming anemone, the flame of the arbutus, the graceful fern, the low growing violet, and all the beauty and fragrance of sylvan life whose subtle influence lifted the heart of the hunter and trapper from the low level of mere utility. As civilization swung along its resistless march and man ceased to feel the stern necessity of felling forests, of slaying predatory beasts, and the battle for mere existence lessened in intensity, besides planting his fields of maize and wheat, he laid out humble flower gardens and the beautiful had its small share in his pioneer life. From simple and elemental conditions, the cultivation of flowers kept pace with the growing complexities of life until we reach the "tulip mania" during which madness men paid as much as $6,000 for one bulb and ruined fortunes was the portion of some of its devotees. Louis XIV. of France, in building his wonderful palace at Versailles, planted an orangery which is one of the rights of Europe to-day; and a modern nobleman has expended £200,000, upon one orchid conservatory.

The fact is sometimes commented upon that nearly every nation has the symbolism of an animal,—the bear of Russia, the lion of England, the dragon of China, the elephant of Siam, and the eagle having been claimed by a number of countries from ancient Rome down to our own nation. The psychologist would question, is this significant of the fact that the *animal* is to the front? are we willing to-day, we, "the heir of all the ages," to be symbolized by the beast? But is it not an aesthetic counterweight that nearly every country has also its floral insignia? England is typefied by the rose, Ireland by the shamrock, Scotland by the thistle, France by the lily and Switzerland by the edelweiss. In this connection we might recall the fact that after all the animated discussion by the press and the people, and even the serious attention of Congress, *we* are still without a national flower. The golden-rod has had many ardent champions, but with the evolution into politics of the "silver party," the golden-rod, from its very name, would no doubt sustain a losing fight. This would be one instance, at least, in which there would be an answer to the Shakespearean query, "what's in a name?"

The whole range of literature from the Bible down to the last versifying effort of the neighborhood poet, is like some vast conservatory of bloom and fragrance. Flowers have at some time been the inspiration of every great writer, especially is this true of the poets, and one might as easily imagine the world without poets as without flowers. Who does not recall Moore's tribute.

"'Tis the last rose of summer
Left blooming alone."

Among his many exquisite lyrics none are more musical than this. The most poetical of all Scottish bards in the sudden up rooting of a daisy by his ploughshare, breaks fourth in song,—

> "Wee modest crimson—tipped flower,
> Thou's met me in an evil hour,
> To spare thee now is past my power,
> Thou bonny gem."

Wordswoth, the poet-philosopher declared that,—

> "To me the meanest flower that blows,
> Can give thoughts that do often
> Lie too deep for tears."

Bryant sang to the fringed gentian,

> "Thou blossom, bright with autumn dew,
> And color'd with the heaven's own blue."

While Dickens turned from his Heaven-commissioned prose to write,—

> "Oh, a dainty plant is the ivy green
> That creepeth o'er ruins old!"

The violet seems to hold a special niche in the heart of the poet, for story confesses,—

> "O faint delicious spring-time violet!
> Thine odor like a key,
> Turns noiselessly in memory's wards to let
> A thought of sorrow free."

Tennyson the supreme master of the senses writes,—

> "The smell of violets hidden in the green,
> Pour'd back into my empty soul and frame,
> The times when I remembered to have been
> Joyful and free from blame."

Goethe's heroine stands with the talismanic daisy in her hand, and plucking the petals she repeats, "he loves me!" "he loves me not! he loves me!"—until the end of the fortune-telling leaves the flower, a wreck, fit emblem of the the sorrowful Marguerite herself.

One of the most bitterly-waged civil wars in all history bears the name of "The War of the Roses," and here is a white rose that has not faded through three hundred years—the white rose sent by a Yorkist lover to his Lancastrian fiancee,—

> "If this sweet rose offend thy sight,
> Clasped in thy hand so fair
> 'Twill blush to find itself less white
> And turn Lancastrian there.
>
> But if thy crimson lips it spy,
> As kiss it thou mays't deign
> With envy pale 'twill lose its dye
> And Yorkist turn again.'"

Priscillia, the Puritan maiden, tells John Alden that she has been,—

> "Dreaming all night, and thinking all day,
> Of the hedge rows of England,—
> They are in blossom now, and the
> Country is all like a garden."

Can we wonder that metaphysicians tell us that the sense of smell is the most subtle of all the senses in arousing memory?

Even Napoleon, that man of iron and blood, believed that "where flowers degenerate man can not live." What reader of history can forget the part played by the Bonapartist violet during the famous "Hundred Days" when Napoleon was a prisoner on Elba? The whole world was counting the heart-throbs of France, and men upon the streets of Paris studied the faces of their fellowmen, and from under the lapel of a coat would be flashed the secret signal of loyalty to exiled emperor—a bunch of violets.

At no time in the world's history has the higher thought of humanity been so dedicated as now to the needy and the suffering. Never before has the Christ standard been so nearly realized, "inasmuch as ye have done it unto the least of these, my brethern, ye have done it unto me." The wheels of the golden coach of Dives often stop by the wayside as he ministers unto Lazarus; the strong are showing a greater disposition than ever before to bear the burdens of the weak, and the gray old world is rolling toward the golden light of a new century. In this world's to-morrow may we not hope that the brotherhood of man, stripped of its false tinsil of communism, with no scarlet thread of anarchy may be truly the inheritance of humanity? No great truth has ever been evolved, no great reform has been accomplished, but that its accompanying symbolism might be traced, as shadow accompanies substance. In the present renaissance of philanthrophy, its symbolism might be fittingly found in flowers. In no other age can be found such occurrences as "flower day," in the many hospitals, prisons and other institutions for the helpless and wretched. Truly may we believe,—

> "Your voiceless lips, O flowers, are living preachers,
> Each cup a pulpit, every leaf a book."

To the confirmed invalid, to lonely old age, to the strong man enduring slow convalescence, what voice could be so eloquent, so unobtrusively sympathetic as "the voiceless lips of flowers?" The history of "flower day" in the prisons is most encouraging to the good women who have taken upon themselves this noble task. Many of the prisoners seem touched and softened by the influences of the day, and nearly all preserve their individual boquet of flowers as long as possible. Who knows but to many a crime-stained heart these flowers are indeed "living preachers?"

Love of flowers is inseparably connected in our thought with refinement, culture and tenderness. Substituting the words flowers, for that of music, we might say with Shakespeare that he that has no love for flowers, "is fit for treason's strategems and spoils." We need no biographical data to know that neither Guiteau nor the Italian murderer of the empress of Austria had ever found any pleasure in a flower garden—a diseased mind and deformed nature feels no impulse toward the beautiful. Contrast with such a nature that of the hungry soul of the imprisoned Picciola, who watched with brooding tenderness the frail flower which struggled up from between the stones of the floor of his dreary cell. Can we wonder that to Picciola the crushing of this delicate flower by the careless foot of his jailor was almost a human tragedy?

For all time the poet has stamped the man devoid of artistic sympathy and lacking in the higher attributes of the imagination by the famous lines:—

"A primrose by the river's brim,
A yellow primrose was to him
And it was nothing more."

This is the man of the ledger, the man who sees nothing worth his sympathy unless it promises to give value received, missing thereby some of the purest joys of the human soul—the joys of generosity, of prodigal sympathy, the glow of heart and soul.

While flowers come to us freighted with so much of helpfullness, their strongest force is perhaps a moral one. The laborer's cottage with its few common-place plants is a hopeful spot for home missions. The city business man stopping on his hurried way to buy a bunch of flowers at a street stall for his office; the crowded up-town cars at nightfall with the frequent glimpse of flowers being carried home to some loved one; the increasing number of flower venders in our great towns—all these are healthful symbols of the day. When some great event of joy or of sorrow comes to a friend, upon such an occasion when lips are dumb and heart and eyes overflow, our speech finds truest expression in flowers. Flowers for the christening, the graduation, the bridal and the burial—these never lose their eloquence.

The greatest Teacher instructed us to "consider the lilies of the field," and from Eden until our eyes shall be greeted by the deathless blossoms of the Heavenly fields, flowers shall have taught us some of the most subtle and significant lessons of life.

> "Spake full well, in language quaint and olden,
> One who dwelleth by the castled Rhine,
> When he called the flowers so blue and golden,
> Stars that in earth's firmament do shine.
>
> Everywhere about us are they glowing—
> Some like stars to tell us Spring is born;
> Others, their blue eyes with tears o'erflowing,
> Stand, like Ruth, amid the golden corn.
>
> In all places, then, and in all seasons,
> Flowers expand their light and soul-like wings,
> Teaching us by most persuasive measures,
> How akin they are to human things.
>
> And with childlike credulous affectation,
> We behold their tender buds expand—
> Emblems of our own great resurrection,
> Enblems of the bright and better land."

MRS. LUELLA WILCOX ST. CLAIR,
Columbia, Mo.

Piano Solo, Miss Hagenstein.

Motion was made by Mr. Wragg of Iowa, and unanimously carried that a vote of thanks be given to Mrs. St. Clair for the beautiful paper read on the Mission of Flowers.

SOURCES OF HORTICULTURAL INFORMATION.

Before speaking of the sources of horticultural information, a pertinent inquiry would be, "What is horticultural information?" Of course it is information pertaining to horticulture, but what is horticulture? It used to be understood as garden culture, in distinction from field culture, and as fruits and flowers were usually grown on small areas, that is usually grown on small areas, that is, in gardens, these came to be known as horticultural products, while those of the broad acres were regarded as agricultural products. But in these later Olden Fruit Farm and Ozark Orchard days, the old idea that horticulture was confined to garden culture and all outside of that was agriculture must give way to a new definition. Just what that definition would be I am far from assuming the prerogative of telling. Whoever attempts to tell exactly what horticulture is, to bound its limits and segregate it from agriculture, will have a difficult task. And why should this be attempted? Does not the solidarity of horticulture and agriculture forbid this except in the most general way? Are not the rose and the apple, the corn and the cabbage, the result of the same physical and chemical forces, the product, it may be, of a single yard of soil, watered by the same cloud, acted upon by the same light, although each develops true to its kind according to the seal set upon it by the Creator in the beginning! Do not, then, let our range of inquiry be limited by narrow meets and bounds.

Yet now another difficulty confronts us. What is information? To say that it is consciousness of facts will be a sufficiently correct definition for our purpose. An object is held before one and he is asked to tell if he knows what it is. Being conscious of a number of facts he replies that it is a flower—a rose we will say. He recognizes the color, the perfume, the size, number and shape of the different parts and a multitude of facts, almost unconsciously, which are summed up in the information that it is a rose. A larger number of facts makes information about the rose bush, and this number is again multiplied and we know varieties, then families, species, genera, orders and classes. Even meager information ranging through plant growth from a specimen to classes comprises myriads of facts, but when to the ordinary intelligence of the average individual is added the information acquired by systematic study the number of isolated facts of which the mind is conscious would be beyond the power of the individual to enumerate. But the facts that make up the total of one plant find their counterpart many times repeated in other plants of the same kind, and with greater or less resemblance in thousands of varieties of plants. Thus it is that, guided by constellations of intelligence, man is able to launch out on the sea of knowledge and not become engulfed in facts. If it were simply facts, unorganized horticultural information, that one is to look for there are numerous sources, one of the most prolific of which is the press. What is the press? It is a mighty force that is scattering to the ends of the earth with a prodigal hand, information pertaining to the entire range of human interest. In Missouri there are more than 1,000 papers and periodicals published, and in the United States this number is increased twenty times. A little calculation may help us to better understand what this means. Put into book form of ordinary-sized page, a year's subscription of *Colman's Rural World* would make ten 300 paged books. In other words, each one of its thousands of subscribers receives yearly printed matter equal to ten 300 paged books, and this achievement is being duplicated by thousands of other publishers of periodicals, while books and pamphlets are also pouring from the presses in floods. This is the most fruitful source of information that man has yet devised, and it is doing much to advance civilization by adding to the sum of individual information. It serves all classes, and none more truly than the horticulturists. In addition to the hundreds of horticultural journals that are published weekly or monthly, new books on fruits and flowers by the the score, bulletins issued by the agricultural experiment stations and the United States Department of Agriculture by the hundreds, even writers of fiction are incorporating a great deal of horticultural information in their works. Such stories as "Driven Back to Eden," by E. P. Roe; "The Kentucky Cardinal," by James Lane Allen, and "At You All's House," by our Missouri writer, James Newton Baskett, are replete with horticultural information, and well worthy of consideration as sources of such.

Another source of horticultural information of very great importance is the horticultural meeting—couuty, state and national—at which men and women of kindred interests come together to talk of these things. Fully appreciating the wonderful power of the press as a disseminator of information it will not do what the sound of the human voice and the flash of light from eye to eye will in conveying information. The horticultural meeting as a source of information is not appreciated at anything like its true worth. And I believe the State Horticultural Society can greatly extend its usefulness by putting forth greater efforts in the direction of local horticultural meetings.

But without enumerating all the sources of horticultural information, I want to speak of one more and that is Mother Nature herself. Is not here the great source of information, and has it not heretofore been, to a great extent, overlooked? But I am glad to note that in these later days we as a people are getting nearer to nature's heart, and when we do that in love she will surely pour out upon us her love and blessings. Did you ever notice how nicely one who loves nature gets along with her? It is much the same with human nature, by the way. "Nature never did betray the heart that loved her." Said Prof. Sanborn to me once over on yonder College Farm: "When a farmer abuses nature she will help him, with ever increasing velocity, down hill toward the slough of poverty; but when a man respects nature and her laws she is ever ready to help him up the hill of prosperity." "But that is another story," as Kipling says. What I want to impress is that nature will give herself to us if we love her, and the more intelligent the love the more she will love the lover.

Here, then, is the conclusion of the whole matter: If horticultural information is wanted, study nature and by this study learn to love her.

Knowing how hard it is to get people who have become "sot" in their ways to change their notions, I am impelled to plead that this study of nature be begun early in life, in the schools. "Ah, 'nature study,' 'agriculture in the public schools,' that's what he's been driving at. Ar'n't we hearing a good deal about that now-a-days?" Thank God we are hearing a good deal of it now-a-days. Said Prof. Davenport, of the

University of Illinois, in a letter received within a week: "The disposition to put 'nature study' in the public schools is sweeping over the country like a contagion, but it is a good contagion." Well do I remember standing on the platform before this society at one of its meetings a number of years ago and reading a paper in advocacy of agricultural education in the public schools. At the conclusion of the meeting a teacher of horticulture who had been president of the Society, came to me and said: "Chubbuck, that was a good paper, but the idea is impracticable." That man is now advocating the teaching of the principles of agriculture in the public schools. He has caught the contagion, and others among the great educators of the land are catching it. But there is much to learn as to how this idea of nature study should be carried into the schools. Many of the suggestions are crude and unquestionably impracticable. A great danger is from empiricism. The instruction must be such as will develop systematic information, and be a foundation on which to build a symmetrical intellectual structure. What is needed first, and above all, is to develop in the children a love and respectful regard for Nature. This, it seems to me, is pre-eminently in the domain of horticulture as commonly understood.

The prominence and antiquity of the mention in holy writ of the trees that are pleasant to the sight and good for food, may justly suggest the importance of their existence and their imperative necessity to the supply of human wants. Well may horticulture be proud of this letter of patent issued in its favor in Genesis, no one knows how long before the mandate which we call agriculture had forced our ancestors to labor in the sweat of their brow amidst thorns and thistles and many inconveniences. No wonder this first born industry claims to be the very poetry of the latter. The special wording of "pleasant to the sight and good for food" is worthy of serious consideration. "Sight" implies the attention, the gratification and education of the mind; "food" refers to the wants of the body. The mission of horticulture is thus a two-fold one, and the notion entertained by many that fruit-growing is its sole destiny, is truly an erroneous one. The supply of material wants, the production of delicious and healthful fruits, has been so phenomenally successful and remunerative as to put its mate, the modest servant ministering to the desires and longings of the mind, quite in the background, even chasing him often out in the woods to enjoy himself amidst the verdant foliage, with no apples in sight to cheer him up. As man was originally set down in a garden, he was linked unknowingly by a mysterious chord to the charms and attractions surrounding him on all sides. He realizes and enjoys the beauties of blooming and fruit-bearing nature, spread out before his wondering eyes. The book of nature before him has many and many pages; he selects the one referring to the original garden resplendent with beautiful trees and flowers, which can be transplanted to his home, grounds and along the walks of daily life. This sympathetic electric chord, vibrating silently between mind and beautiful vegetation, has ever been an active factor in the training and refining of the mind. It has been the fountain-head of fine art, the embellishment of the home. It is by the visible evidences of its existence around the home that we judge correctly the degree of mental culture of the owner.

Might not this God-given impulse be fostered and strengthened amidst the process of training the juvenile mind of a coming generation, commonly called popular education? Would it not assist the steady advancement towards a higher plane of the civilization of our day and those to come? This question has often been whispered in the practical era of the exponents of popular education by illusionary, dreaming (?) horticulturists, but treated as a mere matter of pastime gardening, it is generally dismissed with, at best, a friendly smile. Would the suggestion be deemed more worthy of serious consideration when coming from the representative guardian of the horticultural interests of one of our great central states, from a State Horticultural Society, delegated to offer practical advice where such is needed, outside of mere speechmaking? Would this time-honored society of our state step forward and offer a few practical suggestions to educators and to the intelligent horticulturists throughout the state?

Botany, the science of the vegetable world, is taught in a necessarily elementary form in public schools. The scope is so endless and encumbered by volumes of hard Latin words and names that comparatively few ever enter into a closer study of the flora and sylva of the land. Practical dissemination of knowledge especially valuable to the agricultural classes is thus sadly neglected. Botany, however, can be brought to far more attractive notice and liking of the scholar by the presence of a variety of living plants growing in conveniently selected places in the spacious school grounds proper. The selection of the material for this purpose should be with a view to illustrating as far as possible the characteristics of the various natural orders into which botany associates the endless variety of kindred types and species. Associated on this principle, even a limited variety of plants will convey a correct idea of the principle of classification described in the text book. The popular flowers of the garden and the fields can thus be seen and studied by the scholars, engrafting the principle of careful culture and neatness of surroundings on their mind, thus dropping a seed in the mental virgin soil which may grow to beautify many a modest cottage home or mansion. A small and insignificant beginning indeed, which can be made in almost any school ground in the country, enlarging as circumstances may permit, till those grounds devoted to the youth of every community are transformed into instructive and attractive rambles. And what a revival of horticultural intelligence and activity would thereby be ushered in. Let nurserymen and florists say Amen.

If a polite and friendly call be made on institutions of higher education, an array of scientific instruments and microscopes will here be met, and stacks of herbarium paper pointed out as evidences of science pure and undefiled. One might in this connection shudder at the words uttered by a wild German professor of physiology, who slandered the herbarium as "scientifically collected hay." Stepping outside the hall of natural science the janitor might feel called upon to explain why the grounds are bare and unimproved. The society might delegate some fluent speaker to argue with the faculty, but would do better to send some one to show them how to make an ideal botanical garden out of the dreary waste surrounding the stately buildings, a garden such as is found in connection with every university or school of higher education across the Atlantic.

Fully admitting the difference existing between a defacto botanical garden and a school ground ornamented to some extent by groups of trees, shrubs and herbaceous plants, however instructive they may be in themselves, and mindful of the difficulties, financial and otherwise, surrounding efforts for the creation and proper maintenance of elaborate collections and displays of botanical assortments, it can nevertheless be safely asserted that a mighty step in advance, in favor of both popular botanical knowledge and decorative horticulture, might be made by a liberal transformation of the school grounds of to-day into grounds representing neatness, order and such horticultural embellishments as circumstances may permit. The influence of such a happy and timely change would be felt in a wider circumference than we can imagine at the present day.

A guide to lead the way to this new departure, giving practical instructions, suggestions at least, of how to go to work, of what to select from the multitude of vegetation, to represent the plants, both economic and decorative, in which the people at large are most universally interested, placed in the hands of the educators, and of all interested in horticultural progress, might awaken an interest never felt before. If issued by the State Horticultural Society it would escape the suspicion and indifference usually allotted to advertising matter in all its ingenious variety. The earliest possible issue of such a practical document might safely be suggested to the Society. And let a Macedonian call be sounded for all lovers of the beautiful in nature to come to the assistance of the movement. All cities of any note are graced in our day by public grounds abounding in ornamental trees, shrubbery and brilliant bedding plants. How seldom does the visitor meet a label, to tell the name of what he is admiring.

How great an opportunity for dissemination of practical acquaintance with gems of sylva and flora is here neglected. A friendly request for more philanthropic policy coming from the State Society would, in a majority of cases, be cheerfully complied with. And public parks in general might, with great propriety, devote a lawn or some section of the grounds to the special interests of the public schools. A great variety of plants, both hardy and exotic, associated in family groups and plainly labeled, might here await the teachers and scholars engaged in botanical study. Will any one deny the educational bearing and value of such miniature botanical kindergartens?

And what will the Normal schools, in which the teachers of the State are trained, be willing to do in order to send out in the fullness of time some missionaries of the progressive horticultural for this? Should not the State Horticultural Society venture to offer some kind suggestion as to how this might be most rationally undertaken? But until this is successfully accomplished, and several years we fear it will be, at best, the friends of education, of beautiful and refined homes, and of progressive lawns and inviting country districts will have to step forward and start the work. And professors of botany and of horticulture in their sanctums will heartily applaud.

LEVI CHUBBUCK, St. Louis, Mo.

Vocal solo by Miss Jennings.

REPORT OF THE CHAIRMAN OMAHA HORTICULTURAL COMMISSIONERS.

Missouri is the leading orchard state in the Union. It is the land of apples, of peaches, of berries. *This* was the verdict at Omaha. *This* is the truth as over 45,000,000 trees attest. To doubt the preeminence of Missouri as the home of these fruits would be to deny the development of the fittest. *Nature* is on the side of Missouri and as long as her Ozarks shall stand, as long as the bluffs of north Missouri and of the Missouri river shall last, as long as the rains shall fall and the sun shall shine, the reddest apples, the rosiest cheeked peaches, the largest strawberries will grow in Missouri.

Missouri did not need to go to New Orleans, to Chicago, to Omaha, to find this out, but the world required these object lessons and it now believes!

Governor Lon V. Stephens deserves the commendation of Missourians in heartily inaugurating the work which led up to the victorious showing of Missouri's resources at the great Trans-Mississippi Exposition. The legislature having made no appropriation for an exhibit, the governor appointed commissioners and requested them to raise a fund necessary to uphold the honor and the glory of the greatest of the trans-Mississippi states at the Trans-Mississippi Exposition. In appointing these men he made no account of politics, and he set an example of liberality by contributing from his purse half a thousand dollars.

The work was entered upon with zeal. An organization was effected in St. Louis, January 5. Clark H. Sampson was elected president, M. V. Carroll, secretary, and an executive committee, also committees to represent the different interests of the State were appointed. I was honored with the chairmanship of the committee on horticulture. Feeling the great responsibility of representing in part so grand an interest, and, also as a member of the executive committee, I attended all of the seven meetings of the commission in St. Louis, Kansas City and Omaha. Speaking for the horticulturists of the State at the very first of these meetings, I promised that if the exhibit should be made that our committee would see to it that never more should the word "poor" be used by any one in speaking of *grand* Missouri, and I opposed all suggestions to give up making an exhibit. In February our committee was enlarged by the appointment by Governor Stephens of the four principal officers of the State Horticultural Society—men who had had experience in the previous great contests for horticultural honors—men who have proven themselves Deweys in winning medals.

By these additions to our committee success was assured, giving us powerful helpers and the backing of a grand old society that has added millions of dollars to the wealth of the State.

At the meeting of the commission in St. Louis, April 26, Hon. Clark H. Sampson's resignation as president was accepted. He is an able man and his contributions in time and money were invaluable. A press of personal and *other* public business forced him to retire. Col. F. M. Sterrett, who had been giving his able services as assistant secretary to the commission, was unanimously elected to the vacancy. It is a high pleasure to here testify to the loyal energetic work of President Sterrett and to acknowledge our personal and collective indebtedness to him for his great and repeated services. We congratulate him on the grand result of this one hundred and fifty days campaign in the white city of Nebraska.

At the final meeting of the commission, May 26, the division of the general fund, first suggested by our committee, was made and the sum of $2,205.78 was turned over to our committee treasurer. The total fund raised in the State was $14,020.29 of which St. Louis, be it remembered to her credit, contributed over one half.

In reporting the work of the general commission we have passed by important proceedings of our horticultural committee. Pursuant to call of chairman a meeting of our committee was held in Springfield, May 5, and a full organization was effected by electing L. A. Goodman, secretary, J. F. Davidson, treasurer, and Col. J. C. Evans and Hon. N. F. Murray, executive committee, the chairman, secretary and treasurer being ex-officio members of this committee.

At a full meeting of our Horticultural Executive committee in Kansas City, May 16, plans were discussed and the work in hand entered upon with confidence. Arthur T. Nelson, of Lebanon, son of this society's treasurer, was appointed superintendent. The chairman, secretary, N. F. Murray and A. Nelson, visited Omaha on the following day, the seventeenth, selected space in the Horticultural Building, 27x30 feet, planned the tables and shelving and contracted for their construction at a cost of $163. Right here it is but just to remark that arrangement of these tables contributed not a little to the pleasing effect of our exhibit and L. A. Goodman is the artist who took the measurements. Previous to this meeting we had secured sixteen barrels of cold storage apples, thirteen varieties, at a cost of $96. Nebraska, knowing what was coming and having a strong fund to draw on, selected 160 barrels of apples in the fall of '97 and placed them in cold storage to be ready for her tables.

As chairman, long before the organization of our committee, immediately after the meeting of January 5 in St. Louis, I commenced the work organizing the counties of South Missouri for the purpose of raising funds and of securing donations of fruit. I was only able to turn over to our treasurer $142.50, collected in Springfield and in Barry county. This was in addition to the $40 previously turned over to the general committee. We recovered from the exposition management $148.52 for space overpaid, so our total fund including the $2,205.78 turned over from the general fund, amounted to $2,476.78 less than half the lowest estimate it was considered necessary that we should have to make a contest for horticultural supremacy. But if our fund was small our friends on the farm were numerous and steadfast. If we secured but little cash we obtained promises of fruit, which were loyally redeemed. Admiral *Schley* said at Santiago, "that the victory over Cevera was due to the men behind the guns." The victory at Omaha was due to the contributor of cash and of fruit by the men on the farm and in the office.

June 1 the exposition gates were duly opened. The Missouri horticultural exhibit *was ready*. All the plates on our tables and shelves were filled with handsome apples, luscious strawberries, black raspberries, cherries, currants and gooseberries. From that day till the closing of the gates there was no vacant space in our 835 feet. We owe much to the Agricultural College for the 240 jars of fruit, vegetables and nuts—one of the finest collections in the country. It was a pleasure to have President Murray with us on the opening day.

One who has taken no part in the work of maintaining for five months a fruit exhibit in a friendly rivalry with Illinois, Iowa, Nebraska, Kansas, Wisconsin, Colorado, Montana, Oregon and Idaho, and with California adjoining your space, can not estimate the labor, care and expense involved. There is work for head and hands sixteen hours a day. Supplies must be certain, correspondence attended to and the plates and tables kept in order. Mr. A. F. Nelson was a willing worker, taking pride in the appearance and the arrangement of the display, rejoicing in the compliments paid his state. Our strawberries, Lucretia dewberries and peaches were beyond comparison in appearance and quality. It was pleasing work after the regular morning task of sorting over the fruit, washing plates and wiping apples to "stand up" for Missouri. Our force made it a rule to interest all visitors who exhibited any desire to know more of the state that produced the allurring fruit before their eyes. Several declared they would take a trip down into the counties that grew such apples and peaches and look for a home. At Mountain Grove last month, sure enough, we found several who, after having visited our display had located and were going to plant orchards.

It was diverting to hear the remarks some visitors made as they arrived at our exhibit. "You ought not to tantalize us by showing such lovely berries, it makes us hungry for some!" said the ladies. "Oh, my! what luscious peaches!" "Land of the Red Apple!" hundreds exclaimed. "Will you sell any fruit?" many inquired. No! we sold none. If there were specimens to spare they were gladly given to some of the ladies who were the most enamored with our exhibit. It was the intention of our committee to have a peach day, and give away a carload of Elbertas. This had to be given up, but on Missouri Day, October 10, we did give away twenty barrels of apples.

It was a friendly colony that occupied the horticultural building. There were no jealousies. While each state was loyally championed by its representatives there was not the least shadow of any discord, no lack of courtesy. On the contrary friendships were formed that will last through life. Missouri was between California and Nebraska. Surely pleasanter neighbors could not be desired. Kansas was directly opposite, so was Montana, and during the last month Washington opened up some big apples. Diagonally to the right was Iowa, good neighbors too. Each was ready to loan anything, but *fruit*. Illinois made a fine exhibit of apples and pears. Colorado did not appear in evidence until the middle of September with her handsome apples, neither did Idaho, with apples and a few peaches. Wisconsin came in at the eleventh hour with some beautiful apples. Oregon placed her exhibit early, which was largely of evaporated fruits.

Naturally the representatives of these states, dwelling temporarily under one roof, some of them for five months, all inspired by the same sentiments, formed lasting friendships. The Missouri contingent will certainly remember with pleasure her neighbors in the beautiful Horticultural building at Omaha.

Our committee endeavored to manage its finances so as to have no deficit at the close of the exposition. We relied upon our high colored fruits for decorations, so we spent but little for other ornamentations. Forty dollars paid for our signs and bunting. We employed no professional artists, realizing [that a well arranged display of Missouri fruits would attract more attention than any mere handiwork.

Our first object was to secure the best fruits our state possessed. This was for the most part donated. We realized, too, that the sum entrusted to us which liberal hands had taken from their personal funds, should be made to do as much as possible for the state. Not a cent should be wasted. None of it went for Pullman car service. Our commissioners did not stop at $2.50 a day hotels. Salaries were regulated to correspond with the minimum board charge, no account being taken for time or damage to private business. We hoped to do so well and to accomplish so much that, when the Exposition was over the men who contributed the funds and the fruits would say, "Well done, good and faithful servants!" Of the thousands of our citizens who saw our tables all expressed agreeable surprise to find so excellent a display.

How did we come out? It is with some pride that we can report that, after paying every bill, we have $57.18 in the treasury. And there is a good prospect that considerable will be recovered of the $400 paid to the express companies. Col. Evans has the promise of the managers of two companies that this will be done.

Our contributions of fruit came from thirty-seven counties. The number of contributors from each of these counties varied from one to forty-two. Wright county is entitled to the honor of heading this list. The Mountain Grove Horticulturists were well organized and they voted to send a box of the fanciest fruits obtainable every Monday for the five months. Some very fine apples grown near this place were also purchased. These were the Jonathans that drew exclamations of delight from thousands. There were fifty plates of them and they attracted more attention than any other apples in the building. The grower, a thorough orchardist, should have a piece of the gold medal that was awarded to Wright county.

The second county in number of contributors of fruit is Barry, with seventeen. There are six fruit growers associations in that county and early in the work of organization each of these societies agreed to send a box of fruit on one day of each week during the exhibit. It happened that but little fruit was grown there. Seligman and Exeter very nearly complied with their pledges. The lack of fruit prevented complete fulfillment. In *amount* of fruit donated Wright county stands first, Barry next, Holt third, Laclede and Howell following. Most of the fruit from Holt, Clay and Laclede was donated by one citizen of each of these counties. The gentlemen are entitled to their gold medals. West Plains, Mansfield, Cedar Gap, Mountain Grove, Lebanon, Boonville, Holt county, Clay, Barry and other counties, sent splendid specimens. Elbertas finer than ever before seen in Omaha.

Yes, friends, had you seen our tables in the height of the peach season, when as many as 1,500 plates were filled with fancy peaches of the leading varieties, you would realize that the exclamations of visitors were eminently proper and natural. Size counts for much in an exhibit. Our nine-pound sweet potatoes, our egg plants, our pair of cabbages weighing thirty pounds each, and measuring five feet in circumference, drew remarks from every passer-by. The fine grape display from Brandsville, certain jars of fruit and vegetables, helped to make our exhibit popular. Again, had you been there looking after these fruits of tree and vine; had you heard the comments from day to day, first on our berries, next on the peaches, then on the red apples, we should not need to ask pardon for so long a story. It would be unfair not to add in behalf of hundreds of fruit growers who did not send supplies, that they did not have them *to* send. Had this been a good fruit year our display could have been maintained during the one hundred and fifty days without the expenditure of a dollar for fruit. Certain localities were favored this year; the highest points yielded the peaches and apples.

Now, for the awards! We confess that the subject of medals took too little of our thought. We were working for impressions on the two millions who passed between our tables, desiring to stamp upon their minds the fact that Missouri is the home of the berry, the peach and the apple, thinking more of this than of winning engravings of gold or silver or bronze, but, for the *greater* millions who were *not there* it was very necessary indeed to have the evidence in writing on substances that can be seen, so it was fortunate that Secretary Goodman, Col. Evans and A. Nelson came on duty on the closing month to look after this part of the business, to have the record in order. We are glad to have with us to-day the eminent horticulturist who made the awards in the Horticultural building. Surely Mr. Van Deman is a good judge. Here is the record. We were awarded

14 gold medals.
13 silver medals.
31 bronze medals.
20 diplomas.

These tell the story. They are souvenirs to their possessors. To the world they will speak with authority as to the merits of Missouri as a fruit State. In all we took seventy-eight awards. At Chicago, Missouri took twelve awards. According to President Sterrett we took three hundred and sixty-six awards for all our State exhibits. At Chicago Missouri took one hundred and seventy-nine. Mr. Sterrett also states: "These awards were as difficult to obtain in Omaha as in Chicago." We procured as many awards as our Eastern, Northern and Western neighbors combined, although Illinois had a legislative appropriation of $45,000; Iowa $35,000, and Kansas a railroad and other appropriations of $30,000. The horticulturists of Missouri congratulate the committee on Education, on Agriculture, on Mines and Forestry, the State University, on Woman's Work, and on Negro Work, on their success. And every member of our committee extends thanks to the fruit growers of Missouri who sent us fruits.

It is *well* that Missouri participated in the exposition. Because of it she will stand higher than ever before in the opinion of the country. The United States, by an exhibit of her resources, on sea and land, in voluntary contributions of patriotism, valor and material, during one hundred days' trial, placed the Stars and Stripes high over all other national emblems. Missouri, in this peaceful competitive showing at Omaha, sustained by voluntary contributions, has still further raised the reputation of her products and she is known and respected the country over as the first of the Trans-Mississippi States.

G. A. Atwood, Springfield, Mo.

FOURTH SESSION.

Thursday, December 8, 9 a. m.

Prayer by Rev. E. T. Abbott, St. Joseph.

Reports from county societies: Mr. Atwood reported that the Springfield society was larger than ever, and was prospering. A. J. Davis of Cole reported that there was some increase of interest in his county.

A. Nelson reported that the Laclede society still lives and that individual members would plant as many as ten thousand peach trees, beside the regular orchard planting.

COLE COUNTY HORTICULTURAL SOCIETY OFFICERS.

J. B. Brooks, President, Jefferson City.
T. M. Barker, Vice-President, Centretown.
A. J. Davis, Secretary, Jefferson City.
F. M. Brown, Treasurer, Jefferson City.

The year 1898 has been full of surprises and disappointments to the fruit growers of Cole county. Strawberries gave us a much better crop than we expected to have, while raspberries and blackberries bore but a light crop. Grapes rotted badly. Apple trees were white with bloom, but set little or no fruit, and what little did set the greater part was imperfect. Pears, plums and cherries bloomed perfectly, but set a light crop of fruit. Peaches disregarded all law of nature and bore a fine crop, after having been twice frozen; the first time when the buds were nearly ready to open, and the second time just as some of the buds were opening. Elberta ripened its fruit at least two weeks ahead of its proper time, and Family Favorite two or three weeks later. All late peaches rotted badly; fully fifty per cent dropped before they were ripe enough to pick, and a large per cent of those that were placed on the market rotted before they could be sold. Blight, peach yellows, borers and other injurious insects were all on hand in full force this year, and I believe have killed about as many fruit trees in this county as were planted out last spring. If the men who have orchards, and are buying trees nearly every year to replace those that die, would attend the meetings of our local society, and give a little time and money to learn how to wage war on the diseases and insect pests, they would save money and have plenty of fruit, but it is the same old story, they always will be saving at the spigot and wasting at the bunghole. Horticulturists need have no fears of competition from this class of men.

L. V. Dix planted out 20,000 peach trees last spring, and several other parties planted out young orchards of from fifty to five hundred trees.

ALBERT J. DAVIS, Secretary.

REPORT OF BARRY COUNTY HORTICULTURAL SOCIETY FOR 1898.

The society has lost in members only sixteen in good standing.

OFFICERS.

H. C. FITCH, Seligman, President.
B. KIRBY, Purdy, Vice-President.
G. G. JAMES, Exeter, Secretary and Treasurer.
W. H. STRANG, Seligman, Chaplain.

The society has not done the work of former years.

Not as many meetings; not so many papers read; attendance much less; had no exhibit this year, and have no fruit to send to the State meeting. The short crop this year, and that so many have no interest only in berries and their local society, are some of the causes of our decline. With a full crop this year we will be all right.

Out of the seven committeemen appointed to collect and ship the products of the county at railroad stations, only two made reports as having sent anything to the Omaha Exposition.

H. C. Fitch of Seligman and G. G. James of Exeter, sent fruit and vegetables from June 1, to October 10. This effort secured a gold medal for Barry county, which gives her a place with the leading counties of the State. Barry County Horticultural Society gave the last dollar in her treasury to the Exposition, and her county court donated fifty dollars which was of great benefit in keeping up the exhibit. We think we did well on a short crop of fruit, and almost a total failure of apples.

We extend thanks to those who staid at the Exposition and looked after our exhibit daily. Had it not been for their efforts we could not have been successful.

Many thousands of apple and peach trees were planted in the spring. Strawberries were planted to the extent of plants to be had. Raspberries and blackberries, not many planted. We plant and grow all kind of fruit, but not for regular commercial purposes. Everything in the way of fruit has made a splendid growth, and in good shape for a crop in 1899, except the raspberry which, according to all reports received, are about all dead.

Total shipment for 1898.

Strawberries, 12,193 crates at $1.00	$12,000
Raspberries, 3,228 crates at $1.50	4,800
Blackberries, 355 crates at $1.00	355
Peaches, 2,757 crates at 50 cents	1,375
Total	$18,530

I have not all the reports, but $18,000 is some money, but very small when we are capable of marketing $100,000. With a good crop and fair prices, this will be the report for 1899.

G. G. James, Secretary.

REPORT OF LOCAL SOCIETIES.

MONETT SOCIETY.

Eleven car loads or 6,840 crates; express, 1,928 crates; average-sales, $1.08⅓ per crate; all other fruit just enough for home use; three hundred acres strawberries for 1899 all in splendid shape.

Geo. Raupp, Secretary.

PURDY SOCIETY.

Strawberries, 1,300 crates, no price reported; no other fruit shipped; drouth of 1897 and late frost in spring ruined our crops of fruit.

B. Kirby, Secretary.

BUTTERFIELD SOCIETY.

Strawberries, 340 crates; raspberries, 238 crates, no price reported; 8¾ acres of strawberries for 1899; 4 acres of raspberries for 1899; condition not reported.

S. R. Crane, Secretary.

EXETER SOCIETY.

Strawberries, two car of 1,221 crates; strawberries, express, 564 crates; express sales, $1.33 a crate; freight sales, seventy cents a crate; raspberries, 425 crates, sold net $1.50; blackberries, 300 crates, sold net $1; 100 acres of strawberries for 1899; 7 acres of blackberries for 1899; raspberries dead. All fruit (except raspberry) in good condition; strawberries the first for years; our membership is not so large, but will market more fruit than any former year.

G. G. JAMES, Secretary.

WASHBURN SOCIETY.

No report; have waited to the last day.

J. D. BERRYHILL, Secretary.

SELIGMAN SOCIETY.

Raspberries, 2,565 crates; blackberries, 55 crates; peaches, 2,757 baskets. No report of acres or condition, but know they are up to the standard.

H. C. FITCH.

LINCOLN COUNTY HORTICULTURAL SOCIETY.

MOSCOW MILLS, MISSOURI, December 5, 1898.

Pursuant to a call by the writer for the growers of fruits and flowers of Lincoln county to organize a society to promote their interests, seven persons met in Troy, August 30, 1898, and succeeded in organizing a society to be known as the "Lincoln County Horticultural Society." The following officers were chosen: A. H. Kercheval, Elsberry, President; T. D. Mayes, New Hope, Vice-President; B. C. Benedict, Moscow Mills, Secretary; C. F. Wallace, Brussells, Treasurer. We have fourteen members. Our last meeting was held at Silex, October 7, with a fairly good attendance, although the people there had just attended the Farmers' Institute and a political speaking.

Hereafter our society will meet on the second Saturday of February, May, August and November at such places as the Executive Committee may select.

Horticulture is in its infancy in this county. But few commercial orchards have been planted and small fruits are not grown extensively. Our soil is adapted to the growth of most varieties of fruits grown in this latitude. The county is bounded on the east by the Mississippi river.

Cuivere flows through the county from northwest to southeast. There are numerous tributaries to the above rivers. The St. Louis, Keokuk and Northwestern railroad passes through the county from north to south near the bluffs of the Mississippi. The St. Louis and Hannibal railroad passes through the central part from north to south and connects with the Wabash at Gilmore.

B. C. Benedict, Secretary.

MILLER COUNTY'S FRUIT CROP, 1898.

The apple crop almost a failure, not exceeding ten per cent of good, sound fruit; peaches about sixty-five per cent; pears and quinces, seventy-five per cent; cherries, fifty per cent; plums and grapes nearly all rotted; berry crop nearly full. The failure of apples was probably due, in part, to abundant rains while trees were in bloom, interfering, to some extent, with pollenation of flowers, but more, perhaps, to neglect on the part of owners of orchards.

The writer, from an orchard of about five acres, *even this year* sold sold $85 worth of fruit, had plenty left for a large family, besides what was wasted and given away.

He also took a small quantity to the "Queen City Fair" at Springfield, Missouri, on which he was awarded the following premiums: Best peck of winter apples for profit, first premium; plate of Willow Twigs, first premium; plate of new seedlings, first premium; plate of Winesap, second premium; plate, beauty alone considered, second premium.

The horticultural exhibit there was very fine, and the plate of "Ozark Pears" that won the blue ribbon could hardly be excelled.

J. H. G. Jenkins.

THE BENTON COUNTY HORTICULTURAL SOCIETY (ARKANSAS),

meets the first Saturday of each month at Bentonville.

It still persists that it is a part of Missouri and regards the annual reports published by the Missouri State Horticultural Society as the best text books of horticulture published. Our Society has twenty members. The officers are C. J. Eld, President, Bentonville, Arkansas; J. C. Rucker, Vice-President, Dickson, Arkansas; I. B. Lawton, Secretary, Bentonville, Arkansas; N. B. Cotton, Treasurer, Bentonville, Arkansas.

The papers read the year just ended were poem, by Maj. Geo. Bill; How to Make Farming and Orcharding Pay, Mr. Gardner; Diversified Farming, Maj. Geo. Bill; Mistakes in Horticulture, I. Henthorn.

The almost total failure of apples in this locality has had but little effect in detracting from the interest of our meetings, but there are too many whose income is mainly from the orchard who very seldom attend.

I. B. LAWTON, Secretary.

REPORT OF A. NELSON, DELEGATE TO ILLINOIS STATE MEETING.

Mr. Chairman, Fellow Members, Ladies and Gentlemen.—At our winter meeting at Moberly, I was appointed your delegate to attend the winter meeting of the Illinois State Society, at Springfield, Illinois, December 28, 29 and 30, 1897. Arriving at Springfield the night of the twenty-seventh, I found the hotels blocked with people, teachers of Illinois, and friends, attending Teachers Convention. I succeeded in securing a fairly good room, however, and on the morning of the twenty-eighth, found a large gathering of members of different societies and the State Society,—all busy arranging their fruits and vegetables; for, be it known, they give regular premiums on all kinds of vegetables as well as fruits.

For the display of Missouri fruits they furnished me tables in the rear of the hall where meetings were held, thus giving Missouri fruit a very conspicuous place, which I appreciated. The Illinois fruits and vegetables were shown outside of the regular hall, where the meetings were held. While the different societies were interested in getting out their fruits ready for exhibit, I met a number of old familiar faces, who kindly assisted me in getting my exhibit in shape, so that by 10 A. M., all was ready for opening session. There were three sessions the first and second days and two on the third, making eight sessions in all.

While Illinois is a great state and has an army of grand, yard wide, all wool, fruit growers; I am not stuck on those fellows over there, (I hope Illinois has delegates here) I'll tell you why; when at Omaha, you know, we had that Big Red Apple placard or sign boldly stretched across our space, "Misssouri The Land and Home of The Big Red Apple." Mr. Chairman, I now notice that Illinois is claiming to be the home of the big red apple. What an absurdity! Next thing we know Nebraska, the land of apples without any red to them, may swing her banner to the breeze, "Land of the Big Red Apple," she too may try to steal our trade mark, but I guess we will have to set down on them both, as hard and as solid as we did at Omaha. Yet as I said Illinois has an army of grand noble men, yes, and women, employed in horticulture. I am proud of them and prouder still I am an Honorary member of their State Society.

The style and manner of conducting their meeting, I think is no improvement over Missouri; and yet their meetings from start to finish were full of interest to me and I enjoyed them very much. Especially when I challenged them to make a selection of their best Ben Davis and test them side by side with Ben Davis from the Ozarks, of which I had with me some fine specimens. Of course I downed them and I believe they are getting scared, and I guess not scared any too soon, nor scared without cause. Take the meeting all in all, it was very pleasant and very profitable to me, and I can say as the boy did who went to his first circus, "I was glad I was there."

Yet for all, the meetings were full of interest with excellent papers and full discussion on same, and it does one good to meet such men from our sister states to confer and commune together for we are all working along the same line and seeking for same results. Viz. success in horticulture.

Mr. Follet of St. Louis spoke of a flower for the national emblem. Some years ago a society was organized for the purpose of discussing and selecting such a flower, but nothing was accomplished. Perhaps the subject was not in the right hands. He thought this society should take the matter in hand. He suggested a committee of one member from each state horticultural society in the country. He offers the following resolution:

WHEREAS—The selection of an appropriate flower for our National Emblem is a matter of National importance and should be engaged in by competent persons from several the states.

WHEREAS, the selection of one person by each of the Horticultural Societies of the several states, to constitute a National committee, would be an effective method of promoting this object.

Therefore, be it resolved, that the Horticultural Society of the State of Missouri, hereby extends an invitation to the Horticultural Societies of the several states, each to select one person to be a member of such national committee.

That the Horticultural Society of Missouri, hereby appoints Mrs. L. M. StClair to be a member of such committee, representing this state, and requests that the several individuals chosen to said committee by the several states, do communicate with Mrs. StClair at Columbia, Missouri, with a view to the completion of their organization and the adoption of their plan of work.

That the members of the said committee hereby appointed, be requested to report to this society from time to time in relation to this matter.

Mr. Barnes:—It is all right if they choose the Kansas Sunflower.

J. W. Rouse:—Or the Golden Spanish needle.

The motion to adopt the resolution was seconded and carried.

It was moved and carried that the Secretary send the resolution to the various state societies.

C. H. Dutcher:—Offered the following:—

Resolved' that the Missouri State Horticultural Society most urgently recommend to the Legislature that an appropriation of at least $30,000 be made for the erection and equipment of a building on the Horticultural grounds for the accommodation of the departments of Horticulture, Entomology and Botany of the Agricultural College.

Mr. Baxter, of Illnois thought the present facilities in this line were utterly inadequate. He had thought of sending his children to Columbia to school, but after looking through the University he had changed his mind and would send them to the Illinois school at Champaign.

Mr. Wragg:—I was glad to see your University proper ahead of us in Iowa, but when I came to your agricultural and horticultural departments, it seemed your legislature had put its foot upon you. We have very much better facilities in Iowa. We are equipping departments of botany, entomology and horticulture. We have buildings for these and nothing else.

Mr. Irvine:—I think the resolution does not go far enough, $30,000 would hardly erect the necessary buildings, to say nothing of their equipment.

Mr. Hartzell.—$30,000 would not be enough. There is room to spend more money to good advantage without giving the contractor two thirds of it.

Mr. Tippen:—Thought the tax payers were disgusted with the condition of the experiment station. He suggested the appointment of a commission to work along this line.

Sec. Goodman:—I think the experiments will be carried on along the very lines which this society has wanted. We need ouly the equipments, and I think the legislature will give us what we ask for, if we ask them in the right way. I think when we have these buildings we will have just the work done that we want. If we show them the necessity for it. I believe they will give it to us. We are just getting the thing started.

Mr. Baxter:—I did not criticize the work of Professors Whitten and Stedman, but the small means they have for carrying on their work.

Mr. Tippen:—Nor did I mean any criticism upon the men in charge. I move that $50,000 be substituted for $30,000 in the resolution.

Mr. Hartzell:—I second the amendment.

Mr. Atwood:—I understand from talking with Professors Whitten and Stedman that $30,000 is what they want. Let us not spoil it by asking too much, let us have it as first put.

Mr. Follet:—You must demand twice as much as you want; for they always cut it down. We know we can use $50,000 to good advantage; let us ask for that.

Prof. Stedman:—Two years ago I thought we had a very good chance to get $35,000, and they cut it down to $21,000. This was for entomology alone. Now you speak of $30,000 for the three departments of botany, horticulture, and entomology. The botanist will need a green house; so will the horticulturist and the entomologist. We need it to breed insects in in winter. $30,000 will only put up the building leaving us without equipment, sufficient to work to the best advantage.

The resolution as amended was unanimously carried.

Prof. Whitten offered a resolution in regard to teaching horticulture, etc., in the public schools. This was referred to the committee on resolutions.

Secretary Goodman offered a resolution as follows:

WHEREAS the University is a part of the Public School system of the State, therefore be it:

Resolved, that it is our judgement that tuition should be made free in all departments as soon as possible.

On motion the resolution was unanimously adopted.

REPORT OF COMMITTEE ON FLOWERS.

The liberal supply of palms, curicarias and other plants with which the hall is decorated were kindly furnished from the Experiment Station greenhouses and arranged by Professor J. C. Whitten for which we hereby express our high appreciation.

H. C. IRISH.
J. E. MAY.
K. B. WILKERSON.

The report of the Committee on Flowers was received.

J. C. Evans moved a vote of thanks to Prof. Whitten and others who have so nicely decorated this hall which was unanimously carried.

Sec. Goodman read a letter from the President of the Missouri Commission at Omaha:—

St. Louis, Mo., Dec. 5, 1898.

L. A. Goodman, Westport, Mo.,

Dear Sir:—Yours of the 2d at hand. It will be impossible to get you the medals in time for your meeting at Columbia. They have not yet all been plated and none of them have been inscribed.

Very Truly,
F. M. Serrett.

REPORT OF SECRETARY.

In the year 1881 this society met in the old Hall of Agriculture to reorganize and to put the society on a footing equal to that of other States. From that small gathering of six persons, and one of these a Kansas man, there went out an impetous of *will* and *work* that has accomplished much in the interests of fruit-growing in our State, until to-day we need not fear the best of our sister States in any competition that may arise, or in the lessons it may give to the fruit-grower.

The growth of the society and of the fruit industry has been a steady, regular, solid growth, one which develops with the intelligence and knowledge of our workers. It is not that spasmodic or uncertain kind which grows only for a day and is then cut down like the grass of the field; but continued, earnest, energetic, intelligent, and systematic planning and working has made the State to-day what it is in orchards and vineyards and small fruit.

What this society has had to do with this work is already written in the hearts of men and in their lives, as well as in the library of seventeen volumes it has issued.

The society, by its officers and working members, has visited 500 towns of the State and told them how to develop the fruit industry. It has sent out articles of instruction and practical information from more than a thousand men of experience in fruit-growing. It has published, in circulars and reports, information that has brought to this State buyers from nearly every Northern and Eastern State to take our fruits. It has sent out over 50,000 volumns of State reports of the society, and the work of experienced fruit-growers. Who will say what these 50,000 State reports of 400 pages each have accomplished? Who will measure it? Over 100,000 letters of information, of instruction, of experience, of advice, as to location of orchards, character of soil, varieties to plant, how to grow, prune, cultivate, gather, market and make money out of fruits, have been answered. Only those who are thus called upon to answer these questions can realize the magnitude of this one little item of its work, and your secretary has had his just share of it.

But let me call your attention to another and more important part of our society work, and that is in teaching our members how to think and how to study and how to learn. It has taught them *how to see* and how to draw *conclusions* from *what* they see. This is *science*. It has taught them how to *observe* closely *what* they do. It has taught them to apply *their thoughts* (and *control* them) to one subject for a definite time. All this is *education*. It has taught them to use their brain more and their hands none the less. It has opened up a field for our young people to enter in the realm of thought and study and observation that they never knew before, and has led them to think that there is something more than drudgery on the farm. It has opened up to them a new life and interest in what they do. Did you ever realize what a difference it makes in your work if you are working to *some end*, or to *accomplish some result*, or to prove some fact, or to discover some new plan of operation, or create some new fruit, than if you simply *worked* and worked without any end in view. One is *pleasure* the other *drudgery*.

Well dear friends, this is *part* of our work, and a very important part, too, and we have been in love with it all these years, and we are happy that we have such results to show, and have had a hand in producing them.

While thinking these matters over it occurred to me that I should give you a synopsis of what this society has done in another way to help the fruit interests of our State. In this matter I shall not go back of my own individual knowledge and my own participation in this work. I have been asked to give a summary of what this society has done in the way of exhibits and its results. In all of these I have been glad to have had a hand in helping make them a success and win honors for our State.

Outside from the State reports sent out, and the personal contact and the State meetings, I feel free in saying that the greatest and best results to the fruit industry have come from displays of fruits made in other parts of our own country. It brings to us thousands upon thousands of the best people that our country can produce, and brings our State out prominently to the notice of other people.

In 1880, then, we began the first of these great displays at St. Louis in the Merchants' Exchange. For ten days the Exchange was a bower of beauty and a sea of fruit. Our display was the admiration of all the Eastern people as well as Western and as a result of that exhibit, we brought away as premiums:

On 100 Varieties of Apples	$100
On 40 Varieties of Apples	40
On 10 Varieties of Apples	10
On 25 Varieties of Peaches	25
On 10 Varieties of Pears	10
On 10 Varieties of Peaches	10

Eight other smaller premiums, and also the Grand Sweepstakes prize of $200 on exhibit of all kinds of fruits.

In 1881. At Bismarck Fair, at Lawrence, Kansas, an award of $150 was taken on 700 plates of fruit.

In 1881, also, at Kansas City Exposition, a premium of $150 was taken on "Best Collection of Fruits."

In 1882. At Bismarck again, $100 as premium on "Best Collection of Fruits" was captured. Also in 1882, at Kansas City, the premium of $100 was taken on "Best Collection." These four exhibits were made in connection with the Missouri Valley Horticultural Society.

At the American Pomological Society meetings the society was awarded a Wilder Medal as follows: At Cincinnati (Ragan), at Rochester (Evans), at Boston (Ragan), at Grand Rapids (Goodman), at Philadelphia (Goodman and Evans), all these occurring between 1876 and 1886. Meetings every two year.

Again, at New Orleans in 1883, under the Mississippi Valley Horticultural Society, a display was made, and again in 1885. A car load of fruit was taken for exhibition to the Cotton Centennial. This collection was made entirely by State society, and shown by favor of the railroad company, and money paid out of our own pockets, which was afterwards refunded by the Legislature. As a result we secured in prizes:

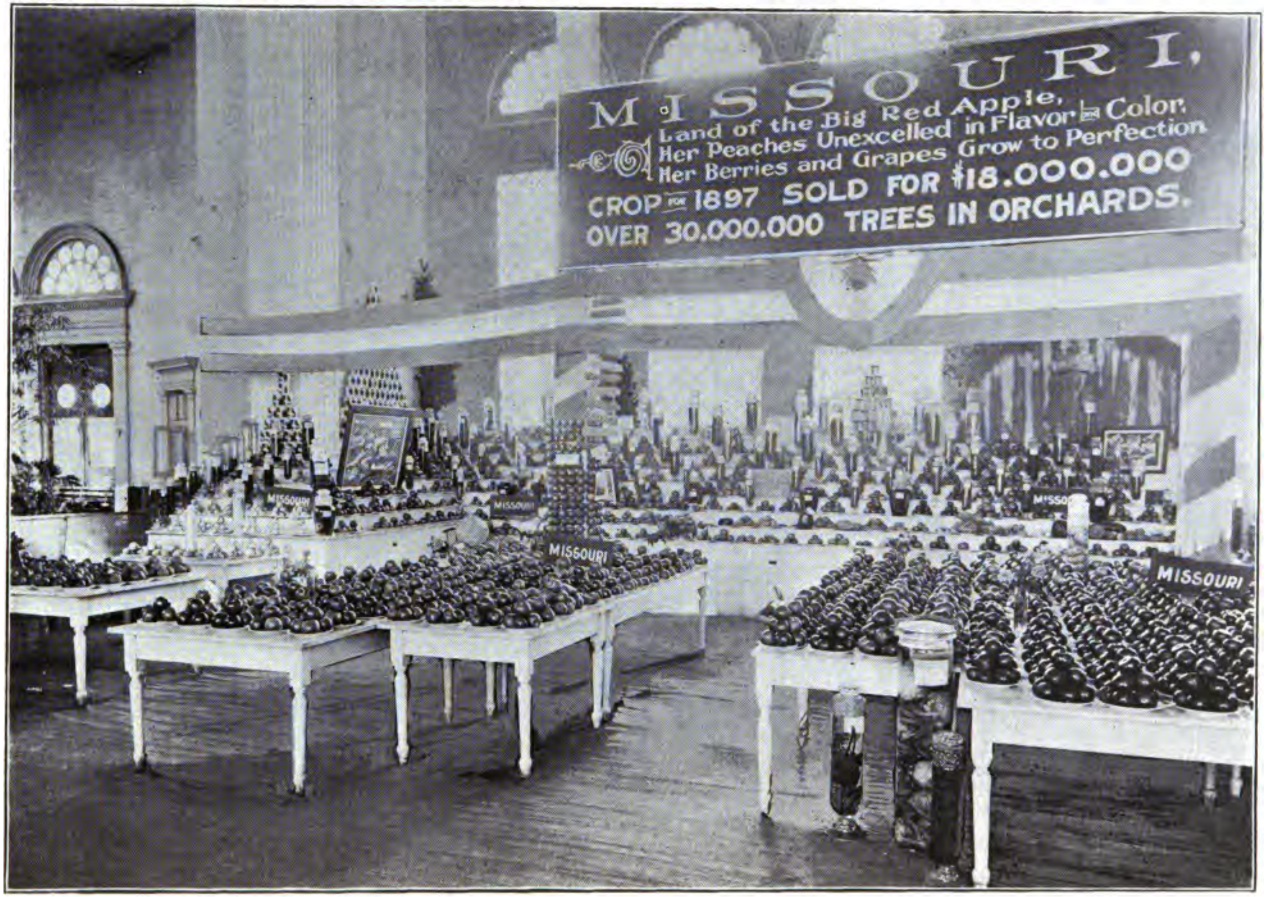
On 200 Varieties of Apples	Gold Medal and	$200
On 100 Varieties of Apples	Silver Medal and	100
On 50 Varieties of Apples	Silver Medal and	75
On Apples from Oldest Tree (82 years old)		10
On Best New Apple		10
20 single premiums on 20 single plates	each,	5

At the St. Louis Fair, for three successive years, the society captured prizes of $100 each year on "Best Collection," and twelve other smaller amounts.

In 1888. The society kept up an exhibition a the tSt. Louis Exposition for forty days and forty nights. At this exhibit we had 3,500 plates on the tables. No award was made for this, and only a letter from the Exposition was secured. At the close of the exhibit there were on the tables nearly 100 barrels of fruit.

In 1893. At Chicago was made the greatest show ever attempted. For six months the tables were filled with the fresh fruits and the society received six awards, besides special mention as to the artistic display. Again the society stepped into the breach and did the whole of this great amount of work, preparing the year before all the jar exhibit and putting a car load of the finest specimens in cold storage in Chicago to draw from. The management of this exhibit was in the hands of President Evans, and he untiringly and devotedly gave his time and means to this work for nearly two years.

In 1894. Again the society kept up its show at the St. Louis Exposition for forty days, and it became the means of bringing many fruit growers and buyers to our State, and interesting many others.


MISSOURI,
Land of the Big Red Apple,
Her Peaches Unexcelled in Flavor and Color.
Her Berries and Grapes Grow to Perfection
CROP for 1897 SOLD FOR $18.000.000
OVER 30.000.000 TREES IN ORCHARDS.
MISSOURI
MISSOURI
MISSOURI
MISSOURI
MISSOURI

MISSOURI HORTICULTURAL EXHIBIT AT OMAHA, 1898.

In 1895. Again the society did this same work. No awards were made in either case, but the State received the same benefit as a result. These two exhibits cost a great deal of time and care, and a large lot of fruit from our fruit growers, freely donated.

Again, and last, in 1898. The society took up the fruit show at Omaha. For five months there was never a day but that the tables were full of fresh fruits. Beginning with the strawberries and following with each fruit in season, there was made a special show of strawberries, raspberries, blackberries, grapes, plums, peaches, pears, quinces, apples, and all the wild fruits of the woods were on the tables during their season.

No one who has not had to do with this work can realize what it means to *collect*, *keep up*, *care for*, and *arrange* such an exhibit. Continuous work, persistent work, self-sacrificing work; time spent in collecting, in getting others to send in fruit; the worry and care of getting these on the tables in good condition; the naming the varieties and arranging them artistically; the giving proper credit and keeping record of all and every shipment and by whom made; the express and dray; and above all, the proper entry of these fruits gave us something to do, and we did the work when hundreds gave up as a useless job a show of fruits *this year*.

Whether it was properly done the results will grandly show. There never was an exhibit made where so much good was accomplished, and never did we make an exhibit when it was such hard work to secure the fruits as wanted. Hundreds of our fruit men said, in answer to our appeals for fruit, "We *have none* and *can get none*." How many disheartening reports we had no one can know who had not the care. We were placed in a peculiar position. If the display failed, our society, and especially its officers, would get the blame, and we could not let it fail. The *success* is *yours* and the *State's*, the *work* was *ours*. Let not those who *did not help* find fault with the exhibit made under such difficult and discouraging circumstances. Every member of the Horticultural Committee did his full duty in a noble and self-sacrificing manner. On Mr. Atwood, Mr. Evans, Mr. Nelson, Mr. Murray, and your secretary did the work fall most heavily. The following is a list of premiums awarded: Fourteen gold medals, 13 silver medals, 31 bronze medals, 20 diplomas. Total, 78.

AWARDS ON FRUITS.

LIST OF MEDALS FOR MISSOURI FROM OMAHA EXPOSITION.

Gold Medal.

Exhibitor.—Post Office. Wording for engraving.
State of Missouri, Westport, Continuous Display Fruits, 7890 plates.
Missouri State Horticultural Society, Westport, Display of Fruits, 3456 plates.
Missouri Agricultural College, Columbia, Collection Fruits in Jars.
Missouri Agricultural College, Columbia, Collection Nuts in Jars.
Jackson County Horticultural Society, Westport, Collection of Fruits, 2191 plates.
Holt County Horticultural Society, Oregon, Collection of Fruits, 791 plates.
Mountain Grove Horticultural Society, Mountain Grove, Collection of Fruits, 727 plates.
Howell County Horticultural Society, West Plains, Collection of Fruits, 704 plates.
N. F. Murray, Oregon, Collection of Fruits, 697 plates.
Barry County Horticultural Society, Exeter, Collection of Fruits, 645 plates.
Laclede County Horticultural Society, Lebanon. Collection of Fruits, 515 plates.
Olden Fruit Company, Olden, Collection of Fruits, 506 plates.
A. Nelson, Lebanon, Collection of Fruits, 503 plates.
J. C. Evans, Harlem, Evans Peach (New), 145 plates.

Silver Medal.

Missouri State Horticultural Society, Westport, Collection of Apples, New and Old.
Missouri State Horticultural Society, Westport, Collection of Peaches.
Missouri State Horticultural Society, Westport, Collection of Berries.
Missouri State Horticultural Society, Westport, Collection of Pears.
Missouri Agricultural College, Columbia, Small Fruits in Jars.
Missouri Agricultural College, Columbia, Injurious Fungi.
Greene County Horticultural Society, Springfield, Collection of Fruits.
Jasper County Horticultural Society, Carthage, Collection of Fruits.
St. Louis County Horticultural Society, St. Louis, Collection of Fruits.
Rockport Fair Association, Rockport, Apples and Pears.
H. W. Jenkins, Boonville, Dewey Cling Peach.
Henry Wallis, Wellston, Collection of Grapes.
Henry Gugle, Mountain Grove, Colleetion of Fruits.

Bronze Medal.

Missouri State Horticultural Society, Westport, Collection of Grapes.
Missouri Experiment Station, Columbia, Collection of Grapes.
Union Fruit Company, Mountain Grove, Collection of Fruits.
Nodaway County, Maryville, Collection of Fruits.
Oregon County, Koshkonong, Collection of Peaches.
Harvest Home Association, Burlington Junction, Collection of Pears and Apples.
Boone County Horticultural Society, Columbia, Collection of Fruits.
J. T. Snodgrass, West Plains, Collection of Fruits.
Brandsville Fruit Company, Brandsville, Norton's Virginia Grape.
Howard Fruit Farm, Willow Springs, Collection of Fruits.
G. G. James, Exeter, Collection of Fruits.
Louis Erb, Cedar Gap, Collection of Fruits.
H. C. Fitch, Seligman, Collection of Fruits.
H. C. Fitch, Seligman, Berries.
Robert Waer, Springfield, Pears and Apples.

Edward Moyer, Mountain Grove, Pears and Quinces.
J. W. Yocum, Mansfield, Snow Peaches.
H. S. Kellar, Mansfield, Flemish Beauty Pears.
C. Shults, Craig, Collection of Apples.
W. E. Clary, Mountain Grove, Lowell Apples.
J. B. Wild & Bros., Sarcoxie, Berries and Evergreens.
J. N. Draper, Springfield, Vegetables.
B. Womack, Bruner, Apples.
W. A. Gardner, West Plains, Apples.
E. J. Meeker, Birch Tree, Apples.
George Raupp, Monett, Etta Grapes.
L. K. Hazeltine, Dorchester, Ingram Apples.
J. Blickensderfer, Lebanon, Apples.
Mrs. Lulu Loomis, Mansfield, Egg Plants.
J. W. James, Mansfield, Peaches.
W. Marion Cole, Springfield, Grapes.

Diploma.

A. D. Hanks, Mansfield, Stump the World Peaches.
Homer Reed, Kansas City, Keiffer Pears.
V. S. Evans, Greenfield, English Rambo Apples.
Missouri State Commission, St. Louis Sweet Potatoes.
Missouri State Commission, St. Louis, Sweet Potatoes (New).
C. B. Emery, Mountain Grove, Cucumbers.
J. R. Milne, Elm Grove, Keiffer Pears.
Missouri State Horticultural Society Westport, Onions.
John Conrad, Olden, Chinese Cling Peaches.
R. C. Sedgwick, Mt. Vernon, Gandy Strawberries.
Austin Wedge, Mountain Grove, Globe Peaches.
G. G. James, Exeter, Heath Cling Peaches.
A. H. Bailey, Mountain Grove, Grimes' Golden Apples.
O. C. Roby, Rocheport, Susquehanna Peaches.
C. B. Emery, Mountain Grove, Peaches and Apples.
Geo. Fansher, Mountain Grove, Flemish Beauty Pears.
W. J. Akenbright, Mountain Grove, Wolf River Apples.
W. H. Stone, Mountain Grove, Red Astrachan Apples.
J. J. Davis, Kansas City, Cabbages,
T. M. Culver, Koshkonong, Peaches.

There were 37 counties represented and 160 persons made an exhibition. It shows that it was a hard year to collect fruit, for some of our best men and counties could not be represented because of the most general failure of the apple crop we have known in twenty-five years.

The grand total of fruit shows this society has made is 19. The num- of premiums awarded, 140; medals taken, 73 (15 gold, 27 silver, 33 bronze), and 74 diplomas; money captured $1,700. Can you show me another society in the Union which has done *as well?*

Before leaving this subject I want to, in this public way, give credit to those who have so well and nobly carried this matter to such a successful conclusion. Mr. Atwood and Mr. Nelson did more than us all in the first organization, and then followed it up with *every-day* work until the close. Mr. Evans and Mr. Murray put their shoulders to the wheel all through the exhibit, and Missouri will never get through paying them.

LIST OF EXHIBITORS, MISSOURI FRUIT EXHIBIT, OMAHA EXPOSITION.

Andrew County.

E. J. Segesseman, Amazonia Peaches.
Rockport Fair Association Rockport, Pear, Peach, and Apple.

Audrain County.

P. S. Mullendore, Savannah, Yellow Corn.
Jas. Reynolds, Savannah, Yellow Corn.
Nick. Mann. Savannah, Yellow Corn.
Martin Esineger, Savannah, White Corn.
W. M. Pearson, Mexico, Pear, Quince, and Apple.

Barry County.

J. M. Mitchell, Seligman, Raspberry.
W. D. Pollett, Seligman, Strawberry and Raspberry.
H. M. Murray, Seligman, Strawberry and Raspberry.
H. C. Fitch, Seligman, Raspberries, Cherries, Pears, Peaches, and Apples.
G. G. James, Exeter, Apple, Peach, Pear, Plum, Cherry, Raspberry, Blackberry, Strawberry, Gooseberry, Pieplant, and Onion.
W. W. Hitt, Exeter, Raspberry and Blackberry, Pieplant, Wax Bean, Potato, and Onion.
R. A. Howard, Exeter, Strawberry.
I. A. Crane, Butterfield, Strawberry.
Fred Rausch, Butterfield, Strawberry.
D. A. Utter, Butterfield, Strawberry.
A. N. Twilliger, Butterfield, Strawberry.
G. A. Reed, Seligman, Strawberry.
Monett Horticultural Society Monett, Strawberry.
Geo. Raupp, Monett, Etta Grapes.

Boone County.

D. A. Robnett, Columbia, Apple, Plum, Blackberry.
Experiment Station, Columbia, Fruit in Jars, Injurious Fungi, Nuts, Nursery Stock, Grapes, Vegetables.
O. C. Roby, Rocheport, Peaches.

Buchanan County.

R. L. Ran, St. Joseph, Cut Flowers;

Christian County.

B. Womack, Bruner, Apples.

Cass County.

Abner Taylor, Harrisonville, Pears.

Cole County.

A. J. Davis, Jefferson City, Apples.

Clay County.

J. C. Evans, Harlem, Apples, Pear, Grape, Plum, Peach, Pawpaws, Peppers.

Cooper County.

H. W. Jenkins, Boonville, Peaches.
Peter Goehn, Boonville, Grapes.
Mrs. Geo. Booweck, Boonville, Paers.
C. C. Belle, Boonville, Apples and Pears.

Dade County.

Jno. Roberts, Greenfield, Apples.
V. S. Evans, Greenfield, Apples.
Geo. Van Stand, Greenfield, Apples.
Miss O. Easton, Greenfield, Quince.
A. Humphrey, Greenfield, Apples.
James Shipley, Greenfield, Apples.

Dent County.

L. B. Woodside, Salem, Apples.

Douglas County.

J. A. Baker, Bushart, Apples.

Greene County.

G. T. Tippin, Springfield, Cherries, Blackberry, Raspberry.
E. H. Grabill, Springfield, Gooseberry.
W. H. Park, Springfield, Strawberry.
Rose Mease, Dorchester, Strawberry.
Walter Nash, Springfield, Raspberry.
Robert Waer, Springfield, Plums, Pears, Apples.
J. N. Draper, Springfield, Cucumbers, Tomato, Onion.
W. Marion Cole, Springfield, Grapes.
Greene County Horticultural Society, Springfield, Pears, Peaches, Apples, Sweet Potatoes.
Zoological Fair, Springfield, Apples, Pears.
Queen City Fair, Springfield, Apples.
John Mooney, Springfield, Apples.

Gentry County.

R. L. Ticklin, King City, Apples.

Holt County.

N. F. Murray, Oregon, Apple, Raspberry, Gooseberry, Blackberry, Pear, Peach, Grape, Cherry, Apricot and Currant.
J. H. Murray, Oregon, Peaches.
G. R. Murray, Oregon, Apples and Pears.
C. Shults, Craig, Apple, Pear, Peach.

Howell County.

J. T. Snodgrass, West Plains, Blackberry, Peach, Apple, Grape.
Olden Fruit Co., Olden, Apple, Peach, Pear, Quince.
Jno. Conrad, Olden, Peaches.
Howard Fruit Farm, Willow Springs, Peaches.
W. P. Storms, Willow Springs, Peaches.
R. B. Shelton, Sterling, Peaches.
A. J. Packard, Sterling, Peaches.
Brandsville Fruit Co., Brandsville, Grapes.
Jas. Stewart, Burnham, Peaches.
W. A. Gardner, West Plains, Apples.
C. B. Buell, West Plains, Apples.

Jackson County.

Missouri State Horticultural Society, Westport, Apples, Peaches, Pears, Plums, Grapes, Blackberries.

Jasper County.

J. B. Wild & Bro., Sarcoxie, Strawberry, Dewberry, Red Raspberry.
G. A. Emery, Carthage, Apples, Pears.

Johnson County.

A. H. Gilkeson, Warrensburg, Apples.
L. B. Thomas, Warrensburg, Onions.

Laclede County.

A. Nelson, Lebanon, Apple, Pear, Peach, Grape, Canteloupe, Squash.
J. Blickensderfer, Lebanon, Apples.
L. B. Cooley, Lebanon, Potatoes.

Lawrence County.

R. C. Sedgewick, Mt. Vernon, Strawberries.
Sloan & Simpson, Mt. Vernon, Strawberries.
Ira Neff, Marionville, Apples.
W. T. Flournoy, Marionville, Apples.

Livingston County.

Fair Association, Chillicothe, Apple, Peach, Pear, Plum, Grape.

Lafayette County.

C. D. Miller, Lexington, Pears.

Miller County.

J. H. G. Jenkins, Eldon, Apples.
J. R. Helpick, Eldon, Apples.

Marion County.

E. B. Jaudon, Palmyra, Grapes.

Newton County.

Neosho Horticultural Association, Neosho, Strawberries.
F. H. Speakman, Neosho, Dewberry.
H. S. Ely, Neosho, Cucumbers.

Nodaway County.

W. R. Kenedy, Skidmore, Plums.
Harvest Home Association, Burlington Junction, Apple, Pear, Peach, Grape.
H. A. Watts, Maryville, Apples.
A. Johnston, Quitman, Apples, Onions.

Putnam County.

J. T. Scott, Powersville, Grapes.

Oregon County.

T. M. Culver, Koshkonong, Apples, Peaches.
W. C. Paynter, Koshkonong, Apples, Peaches.
Alderson Bros., Koshkonong, Apples.
S. Stanley, Koshkonong, Apples.

Platte County.

Homer Reed, Parkville, Pears.

Randolph County.

C. P. Baender, Moberly, Gooseberries, Cherries, Currants, Pears.

Shannon County.

E. J. Meeker, Birch Tree, Apples, Strawberries.
C. M. Richards, Birch Tree, Peaches.
A. W. Hood, Birch Tree, Apples.
D. W. Tetwill, Birch Tree, Apples.

St. Clair County.

W. T. Crafton, Collins, Apples.

St. Louis County.

Henry Wallis, Wellston, Grapes.
J. C. Ruder, Afton, Apples, Pears, Peaches.

Webster County.

Henry Dalrymple, Marshfield, Apples.

Wright County.

Henry Gugle, Mountain Grove, Strawberries, Blackberries, Apples, Pears, Peaches and Potatoes.
Mrs. F. S. Bailey, Mountain Grove, Beans.
Mrs. J. H. Pittenger, Mountain Grove, Beans.
Mrs. J. W. Keys, Mountain Grove, Apples, Plums.
W. H. Stone, Mountain Grove, Raspberries.
Mrs. W. J. Bruffey, Mountain Grove, Peaches, Prunes.
L. H. Gugle, Mountain Grove, Raspberries.
H. Kuby, Mountain Grove, Raspberries.
W. G. Worthley, Mountain Grove, Potatoes.
Anna Crabtree, Mountain Grove, Tomatoes.
J. P. Cowdin, Mountain Grove, Pears, Peaches.
W. H. C. Zion, Mountain Grove, Onions.
J. S. Tucker, Mountain Grove, Grape.
Mrs. C. B. Emery, Mountain Grove, Pear, Peach.
J. K. Siberling, Mountain Grove, Apple, Peach.
Mrs. S. F. Stone, Mountain Grove, Apples.
Mrs. C. Q. Key, Mountain Grove, Apples, Pears, Peaches, Raspberry.
Dr. Worthley, Mountain Grove, Pears.
H. Keely, Mountain Grove, Apple, Peach, Pear, Raspberry, Potato, Beans.
G. S. Killam, Mountain Grove, Pear, Peach, Apple, Blackberry.
W. J. Akenbright, Mountain Grove, Apple. Pear, Blackberry.
J. B. Beigley, Mountain Grove, Apple, Peach, Cabbage.
W. E. Clary, Mountain Grove, Apples.
Geo. Fansher, Mountain Grove, Pears.
Ed. Moyer, Mountain Grove, Pear, Peach.

C. Wittner, Mountain Grove, Persimmon, Corn, Cabbage.
C. B. Emery, Mountain Grove, Apple, Peach, Pear, Grape, Beans, Cucumber, Potato.
J. C. Evans, Mountain Grove, Peaches.
John Clary, Mountain Grove, Peaches.
J. A. Clary, Mountain Grove, Peaches.
Union Fruit Co., Mountain Grove, Apple, Pear, Peach, Grape.
Jas. Lewis, Mountain Grove, Peaches.
Mrs. Peter Knapp, Mountain Grove, Onions.
J. T. Bickford, Mountain Grove, Beans.
A. H. Bailey, Mountain Grove, Apples.
Austin, Wedge, Mountain Grove, Peaches.
J. W. Garner, Mountain Grove, Potato.
C. Lyons, Mountain Grove, Apples.
Dr. Lane, Mountain Grove, Apples.
Peter Fisk, Mountain Grove, Apples.
Sam Candler, Mountain Grove, Apples.
O. K. Vincent, Mountain Grove, Apples.
Mr. Frye, Mountain Grove, Apples.
Mr. Gleason, Mountain Grove, Peaches.
J. W. James, Mansfield, Peaches.
A. D. Hanks, Mansfield, Peaches.
D. F. Sikes Mansfield, Peaches.
Mrs. Lulu Loomis, Mansfield, Peaches.
H. S. Kellar, Mansfield, Apple, Pear, Beans.
E. M. Carter, Mansfield, Beans, Potatoes.
J. H. Yocum, Mansfield, Peaches.
Dan. Killam, Norwood, Apples.

What of the future work in this direction?
In 1899 a display is wanted at St. Louis.
In 1900 a great show at Paris.
In 1901 one at Buffalo.
In 1902 one at Detroit.
In 1903 the best of all at St. Louis.

Do you ask me if there is still work to do? Look around you, you will see it every where, and it will take more earnest effort than ever to reach the best results. If, as during the last seventeen years, this society will stand as a unit in all its work, there will be no reason for failure, and every reason for greater rewards than ever. We have seen a partial fulfillment of all our earnest wishes for this *State* and this *cause*, and it now behooves us to look to greater fields. Let us follow the idea of *expansion* in our work, in our area of orchards, in our plan of management; *expansion* in our pocket-money and in the profit of our orchards; and, above all, *expansion* of our knowledge, our minds, our study.

DEVELOPMENT OF INTEREST.

Another very important feature of our work is the development of the interest in different parts of the State. To-day no one portion of the State can say in jealousy one part is doing more or more largely than another. From north, central, southern, all have their own advantages, and are doing their best to develop them. The hundreds of letters which come to the office are all answered, and information given about all parts of the State. It is our ambition to so direct and assist those who are planting that no costly mistake or blunder shall be made if they will only *ask*. For to-day we have good reliable men all over the State in nearly every locality who can and will answer all local questions which any fruit-grower may ask. There is no reason *to-day* for any one to make the errors *we* use to make.

INTERESTS OF RAILROADS IN THIS MATTER.

Some of our railroads are beginning to see that it is *very much* to their interests to assist in this development. They realize that the fruit interests are much more important in bringing people to the highest development of the lands along their lines than anything else they can do. Did it ever occur to you that it takes 100,000 acres for the support of a savage, while it needs 10,000 acres for the stock man, and 1,000 acres for the wheat man, but the farmer needs 100 acres, and the fruit man can find all he can do and all his family also on 10 acres? Well these are cold facts, and the railroads are begining to see them also.

Another step I wish they would take, and that for their *own interest* and for the interest of horticulture. It seems to me that if they would stop and think well of these matters, they would realize that our fruit men were entitled to transportation when going to these meetings, and also when going on this business of education of the people in this matter.

It is simply folly to try and get people, who know nothing about this business, to take it up and follow it. I have seen hundreds of instances of parties furnishing the land, giving the plants, trees, vines, and shrubs, telling them how to plant and care for them, and then leaving them to work it out their own way, and the result is in every instance failure; no matter what inducement you may offer, if you can not instruct them and educate them, and get them to *study* and think for themselves, then your experiment will be a failure. Here, then, is where the very *great value* of our society shows itself prominently. For the last forty-one years, but more especially for the last seventeen years, have we been trying to teach these facts to our people and instill them into the hearts of the fruit-grower. First, a love for the work, Second, a study of your business. Third, adopting the experience of others. Fourth, perseverance, application, industry, energy, enthusiasm for it. Fifth, think for yourself, watch your work, and draw conclusions from what you see. This brings me to the most important matter now before the society.

THE HORTICULTURAL SCHOOL AT THE AGRICULTURAL COLLEGE.

This school is an opening wedge that will in a few years have the educational feature so prominent before us all and the practical application made so plain that we will wonder why it was that these things were not brought out before this late day. Here come a class of students bent on learning something of a particular topic, and their minds are ready to receive, and their thoughts are ready to be directed in just the direction that will do them the most good and bring the best results. This Horticultural School and the Experiment Station are doing this work. We have found this school directing its work in the lines suggested by this society at its former meetings. There is no longer any fear of refusal, by the State University, in helping to carry out any line of experiment that is wanted by this society.

The line of investigation, so well outlined by Professor Schweitzer, of selection of typical trees, is being well put into use. Trees, the most hardy, the most productive, the most regular in bearing, have been selected and the cions used in the grafting. This continuous selection will be of as much value to us as is the selection of typical seed-corn or seed-wheat. Followed up, this, of itself, will give wonderful results.

Again, this horticultural education should have its beginning right here at the University. Our teachers need to be properly directed and they will take hold of the work and give us just such teaching as we need in our public schools. The society has so prominently brought this matter before the people that they are discussing it in all directions. Even at Shaw's Garden the topic was the subject for discussion for one whole evening. Teach! Teach! Teach! Teachers who know how to do so are what we want in order to bring this subject prominently before our schools. Teaching pupils *how* to think is better than cramming into them bushels of knowledge.

The work of our different local societies has flagged somewhat, because of the poor apple crop. I suppose there never was a time when the apple crop of the State, and, I might also say, that of other states, was so short as this year. Extra fine apples are bringing $6.00 per barrel, and the supply is limited. Boxes from Oregon, holding one bushel each, sell for $2.00. Our failure is *directly* attributed to the cold storm from the northeast for ten days at blooming time, but it is also *indirectly* attributed to the long dry time of 1897, and the very large crop the trees had to carry at that time. The effect of this drouth will continue to show itself for the next few years also, and we shall see dead and dying trees years to come.

This we can not now help, but may relieve it by cutting back, and we can prevent it in the future to a greater or less extent by not allowing such a crop to ripen on our trees again.

About the daily routine of the secretary's work, it has been much the same as in years past: letters and letters, questions and questions, reports and reports, words of instruction and information, places to locate for fruit farms and evaporators, for buying fruits, for organizing societies, encouragement to those who feel disheartened.

The state reports continue to be in demand, and hardly a day passes but that we have called for from one to a dozen of them. Compliments as to our reports, our fruit growers, the work doing, and the enthusiasm of our workers are being received continually. The society stands to-day in advance of the position of last year, and is each day taking a step in advance. Its influence and work is being appreciated more and more by not only our own state, but other states as well. Let us, as one, continue as we have done, have only at heart the best interests of our State and our society, and we will see greater things in the future as a result of our efforts.

L. A. GOODMAN, Secretary,
Westport, Mo.

A. Nelson spoke of the arduous labors of himself and others in planning and executing the fruit exhibit at Omaha. He made four trips to St. Louis, two to Kansas City and one to Omaha. They cut down expenses to the lowest possible point. He put in, without pay, twenty-two days' hard work. He did not take his clothes off for three days at one time.

The motion of Dean Waters, that the laborers in the Omaha exposition be recognized in some way by the committee on final resolutions, was carried.

Mr. Tippen moved that 10,000 copies of the secretary's report be published in pamphlet form for immediate distribution. He spoke of how long the annual report was usually delayed.

Secretary Goodman:—We are at the mercy of the state printer and we have to wait till he is ready.

N. J. Colman:—I will state for the benefit of the Society that E. W. Stephens, of the Columbia Herald, has come into possession of the Tribune company, of Jefferson City, which does the state printing. We all know that he is in sympathy with this society and all societies that have for their object the good of Missouri. I believe he will soon get out the report.

Mr. Barnes:—I like the idea of having the secretary's report printed and distributed at once.

Mr. Tippin's motion was carried and 10,000 copies were ordered printed.

According to this motion the report was printed and the pamphlets sent out over Missouri and other states.

The following item is one of the many newspaper notices acknowledging the receipt of the pamphlet.

MISSOURI'S FRUIT.

In the report of Secretary Goodman, of the Missouri State Horticultural Society, submitted at the forty-first annual meeting of the society in Columbia, Mo., there is much of interest to the people of the state.

Reviewing the society's work, which, he claims, has brought to Missouri buyers from nearly every Eastern and Northern state to purchase Missouri's fruits, Secretary Goodman points out the great growth of the industry from the time when the State Horticultural Society gave its first great display of fruits in the Merchant's Exchange hall, of this city, in 1880, to its most recent exhibition, at the Omaha exposition in 1898. The record is one of uninterrupted development, and is full of promise for the future.

Taking this showing as a text, Secretary Goodman argues for the continued expansion of the fruit growing industry of the state. He calls attention to the great work to be done by his society in developing the interest of every section of the state, in directing and assisting fruit growers, and in enlarging the work of supplying information for the benefit of outside buyers. He also calls attention to the helpful work already done by the railroads, and indicates a wider scope for this work that shall prove a benefit to railroads and fruit growers alike. The inestimable value of the horticultural school and experiment station of the state university at Columbia is especially recognized.

It will repay the people of the state, as well as those more directly concerned in fruit growing, to read Secretary Goodman's report. They will gain thereby a better knowledge of one of the state's most important sources of wealth.—*From the St. Louis Republic.*

REPORT OF COMMITTEE ON FRUITS.

Thos. Black, Harg, Missouri, eleven plates Ralls' Genet	$ 3 00
D. A. Robnett, Columbia, Missouri, six plates Ralls' Genet	50
J. H. Monsees, Beaman, Missouri, two plates Seedling Pears	2 00
Worthy of favorable mention.	
A. H. Gilkeson, Warrensburg, Missouri, one each five varieties Oregon apples	1 00
D. M. Hulen, Hallsville, Missouri, one plate Keiffer pears, one can cherries, one can peaches, one can pears—Collection	2 00
J.T. Snodgrass, West Plains, Missouri, sixty plates eighteen varieties apples	15 00
G. L. Sessen, West Plains, Missouri, one plate apples, seedling of Ben Davis, named Burke	1 00
H. B. Francis, Mulberry, Missouri, collection apples, six varieties	3 00
J. H. Marion, Fulton, Missouri, four plates persimmons, one plate potatoes	2 50
C. H. Dutcher, Warrensburg, Missouri, four varieties apples	1 50
Sam'l Miller, Bluffton, Missouri, three varieties chestnut, three varieties pecans, three varieties persimmons, one variety walnuts	4 00
Conrad Hartzell, St. Joseph, Missouri, collection apples	2 00
Mrs. Bettie Beasley, Columbia, Missouri, one can each plums, blackberries, peaches, apricots and pears	2 00
C. H. Wiest, Columbia, Missouri, one can plum preserves	50
Mrs. F. M. Lowry, Columbia, Missouri, one can each quince, pear, gooseberries and pear preserves	1 50
S. H. Linton, Marceline, Missouri, ten plates, four varieties	2 00
L. V. Dix, Jefferson City, Missouri, one plate pears, two plates apples	1 00
Polster Bros., Wright City, Missouri, six plates Keiffer pears	1 00
M. Butterfield, Lee's Summit, Misseuri, one plate Ben Davis, two plates Japan Seedling Pear	1 00
H. A. Aldrich, Neoga, Illinois, one plate Ben Davis; very fine	1 00
Mrs. J. W. Hamilton, one can peaches	50

Stark Bros., of Louisiana, Missouri, made a fine display of apples, grown in the States of Missouri and Washington.

E. J. Baxter, Nauvoo, Illinois, two varieties of extracted honey.

Eleven varieties Idaho apples. Favorable mention.

H. Belden, Washington, three apples.

H. E. VAN DEMAN, Chairman.
M. J. WRAGG.
J. S. BUTTERFIELD, Secretary.

REPORT OF TREASURER, DECEMBER 6–8, 1898.

A. NELSON, TREASURER.

Amount Paid Out.

July 20	Hudson-Kimberly, half tone	$ 7 30	
	Hudson-Kimberly, five thousand envelopes	7 00	
	G. B. Lamm, printing 100 questions.	13 00	
	S. W. Gilbert, advance money for fruit at Omaha	40 00	
	Warrant 398		$ 67 30
July 26	Postoffice bill	$ 11 95	
	Salary of Secretary for July	66 66	
	Express	50	
	Salary of typewriter	20 00	
	Warrant 399		$ 99 11
Aug. 8	S. W. Gilbert, for fruit at Omaha, September 7	$ 71 20	
	S. W. Gilbert, for fruit at Omaha, September 7	16 75	
	S. W. Gilbert, for fruit at Omaha, September 22	47 95	
	S. W. Gilbert, for fruit at Omaha, October 15	30 50	
	S. W. Gilbert, for fruit at Omaha, October 26	18 00	
	L. A. Goodman, for fruit bought for Omaha, October 27	15 60	
Aug. 8	Warrant 400.	$ 100 00	
Sept. 8	Warrant 403	100 00	
			$ 200 00
Aug. 24	Postoffice bill	$ 27 95	
	Express	45	
	Express	35	
	Salary of Secretary for August	66 66	
	Salary of typewriter for August	20 00	
	Warrant 401		$ 115 41
Aug. 24	A. Nelson, trip to Kansas City and Omaha	$ 9 70	
	A. Nelson, trip to Springfield	2 65	
	A. Nelson, four trips to St. Louis	18 00	
	A. Nelson, trip to Kansas City and Omaha	7 60	
	A. Nelson, trip to Springfield	60	
	Warrant 402.		$ 37 55
Sept. 24	Postoffice bill	$ 20 00	
	Express	1 15	
	L. A. Goodman, trip to Carrollton September 12–14	4 00	
	L. A. Goodman, hotel September 12–14	4 00	
	L. A. Goodman, trip to Pleasant Hill September 15–16	2 10	
	L. A. Goodman, hotel September 15-16	2 00	
	L. A. Goodman, trip to Butler September 20–21	1 80	
	L. A. Goodman, hotel September 20–21	2 00	
	Salary of Secretary for September	66 66	
	Salary of typewriter for September	20 00	
	Warrant 404		$ 123 71
Oct. 27	Scotford, printing postoffice cards	$ 4 00	
	Scotford, printing announcements	2 75	
	Salary of Secretary for October	66 66	
	Salary of typewriter for October	20 00	
	Warrant 405		$ 93 41
Nov. 23	Express	$ 1 10	
	Express	90	
	Kansas City storage	1 00	
	Postoffice bill	25 74	
	Whitehead & Hoag	48 00	
	Salary of Secretary for November	66 66	
	Salary of typewriter for November	20 00	
	Warrant 406		$ 163 40

REPORT OF TREASURER—Continued.

Dec. 1	Five hundred copies Southwest	$ 10 75	
	A. Nelson, trip to Pierce City	6 00	
	Stamps, etc	2 70	
	F. E. Nevins, stenographer, Shaws banquet	10 00	
	Warrant 407		$ 29 45
Dec. 3	Scotford, printing two thousand programs	$ 12 50	
	Postoffice bill	23 29	
	Warrant 408		$ 35 79
Dec. 8	Hotel Bill at Columbia:		
	H. A. Aldrich	$ 4 20	
	M. B. Waite	4 60	
	H. E. Van Deman	4 60	
	L. A. Goodman	14 70	
	N. F. Murray	6 00	
	R. E. Bailey	5 60	
	M. J. Wragg	8 80	
	E. J. Baxter	4 90	
	A. Nelson	9 00	
	Warrant 409		$ 57 40
Dec. 8	Expense at Columbia:		
	N. F. Murray	$ 15 00	
	D. A. Robnett	15 00	
	Sam'l Miller	5 00	
	L. A. Goodman	20 00	
	A. Nelson	32 95	
	R. E. Bailey	25 15	
	Warrant 410		$ 118 10
Dec. 8	Expense at Columbia:		
	M. Murtfeldt	$ 13 00	
	J. C. Evans	7 00	
	E. T. Abbott	10 80	
	M. B. Waite	45 00	
	H. E. Van Deman	40 00	
	Express	9 80	
	Warrant 411		$ 125 60
Dec. 8	Premiums at Columbia	$ 48 00	
	Express	70	
	Express	1 85	
	Express	65	
	Postoffice bill	2 00	
	Salary of Secretary	66 66	
	Salary of typewriter	20 00	
	L. A. Goodman, trip to Jefferson City, railroad	8 55	
	L. A. Goodman, trip to Jefferson City, hotel	2 00	
	Warrant 412		$ 150 41
Dec. 8	A. H. Nelson, work and expenses at Omaha Exposition	$ 34 35	
	Warrant 413		$ 34 35
Dec. 24	Photos of Omaha Exhibit	$ 1 05	
	N. F. Murray, expenses to Iowa State meeting	18 48	
	Prof. L. R. Taft, expenses to Columbia and return	31 50	
	Warrant 414		$ 51 03
Dec. 24	Postoffice bill	42 92	
	Printing five thousand of Secretary's report and envelopes	126 75	
	Warrant 415		$ 169 67
Dec. 26	C. C. Bell, expenses to Illinois State meeting	19 25	
	New books for library	60 55	
	Four half tone cuts for report	21 90	
	Retouching the photos	7 00	
	Four thousand impressions of each	18 00	
	Warrant 416		$ 126 70
	Total paid out		1,793 39
	Balance		250 85
			$2,044 24

REPORT OF TREASURER—Continued.

	RECEIPTS 1898.	
June 30	Balance in Treasury	$ 413 37
July 1	Cash from State Auditor	943 29
Oct. 1	Cash from State Auditor	644 08
	Membership by A. Nelson	25 00
	Membership by L. A. Goodman	18 50
	Total receipts	$2,044 24
	Total paid out	1,793 39
Dec. 31	Balance in Treasury	250 85

We, your Committee on Finance, have examined the report of your Treasurer and find vouchers for each and every account as stated in his report, and report correct in every particular.

J. C. Evans,
F. H. Speakman,
John T. Snodgrass.

LETTERS.

West Plains, Mo., Oct. 11, 1898.

L. A. Goodman, Westport, Mo.,

Dear Sir:—Your favor received. The apple originated on the farm of Richard Burke five or six miles northwest of West Plains. He found the little tree growing in a branch some twelve years since. 'Tis a better grower than the Ben Davis and a hardy tree.

Yours truly,
G. L. SESSEN.

Cowgill, Caldwell county, Mo., Dec. 5, 1892.

Mr. L. A. Goodman Secretary Missouri State Horticultural Society,

Dear Sir:—I thank you for your kind invitation to attend the meeting of your Society that will meet at Columbia this week. It will be out of my power to come, as I am now in my eightieth year of age and rather feeble in health. I planted an orchard here in the Spring of 1854, a year of great drouth, but I hauled water and saved my trees which were half Jennetings. I have never regretted that I planted such a large per cent of that variety, and if I was planting an orchard now I would plant that per cent of Jennetings, as they are the great common purpose apple for the masses of the people. They are hardy and bloom late and are great bearers, and the apples are splendid when they come to perfection. Our great addition of territory in the far away islands of the sea may effect our fruit interests here; we can swap apples, likely, for sugar, coffee and many other good things. The Jennetings that I planted in the year 1854 are still bearing some apples. Your meeting will no doubt be a great success as it will be composed of the leading citizens of the great State of Missouri.

Yours truly,
WILLIAM McCRAY.

St. Louis, Mo., Dec. 7, 1898.

L. A. Goodman, Secretary Missouri State Horticultural Society, Weseport, Mo.,

Dear Sir:—Your esteemed favor 2d instant received and read with much interest, and I regret exceedingly to advise that previous engagements at different points along our road, in the interests of diversfiied farming and the growing of fruits and vegetables for profit, will not admit of my accepting your kind invitation to be present at your annual meeting now in session. I have attended several such gatherings in other states with much pleasure and profit, and doubtless would find your meeting of much interest.

The annual bulletins published under the auspices of your Society came to hand a few days ago, and from the few casual glances made through them, I am satisfied they will be of inestimable value as books of reference in promoting the work I am engaged in for the company, and I am very much obliged for your kindness

The soil and climate of many sections of the country along our rails in the states of Arkansas, Missouri and Louisiana, unite in creating the most favorable conditions for the raising of fruits and vegetables at a season of the year when the early northern markets are ready and ample to take care of them at a handsome profit to the producer, and in my judgment the grand old State of Missouri in a few years will lead the procession as the greatest fruit producing region of "Uncle Samuel's domain." In the states of Arkansas and Louisiana, where cotton has been the staple crop of the country for generations, the farmer by force of habit and education continued to raise cotton until bankruptcy confronted him, which seems to be the only thing that will break the habit with many of them. The landlord renting and credit system so long in effect in that region is largely to blame for this, also in creating a class of renters indigenous to the country, who do not want to live any other way than from hand to mouth.

Recognizing the existence of these conditions, our management sought for a cure, finally deciding in favor of advocating a change in the system of farming, and believing that diversified crops was the only sure road to salvation from the mortgage system, with low priced cotton, they have for several years encouraged the farming communities along our rails in the states named, to engage in growing those crops and fruits best adapted to their soil and climate. At first we met with but little encouragement, due largely to the prejudice natural to a departure from old established methods to take up with new ideas, but, I am pleased to advise, that this feeling is fast disappearing, and the communities as well as ourselves have already felt the benefits of the change.

Very recently we adopted the same line of work with the farming communities adjacent to our lines in the south-eastern part of this state, and from our knowledge of the soil and climate, we feel encouraged to make strong efforts to build up the orchard fruit industry in that region, believing that in a few years it will crowd other and older fruit growing sections of the state closely for first honors, and we bespeak the good will and moral support of your Society in behalf of the growers and ourselves.

Yours respectfully,

D. E. KING.

ELECTION OF OFFICERS.

G. T. Tippin moved that the rules be suspended and that the ballot of the Society be cast for the present officers.

H. J. Waters called for a rising vote which was unanimously responded to.

On motion of Hon. N. J. Colman, Mr. Tippin was authorized to cast the ballot for the reelection of the officers.

The following were then declared elected for the ensuing year:

President, N. F. MURRAY.

1st. Vice-President, D. A. ROBNETT.

2d. Vice-President, SAMUEL MILLER.

Secretary, L. A. GOODMAN.

Treasurer, A. NELSON.

Ballot cast by GEO. T. TIPPIN.

C. C. Bell made a motion that Mr. J. C. Evans be made an honorary member of the Society, and it was heartily carried.

J. C. Evans:—I have been a life member of this Society for many years and thought that there were no more honors the Society could give me, but this is an unexpected compliment and I thank you for it.

President Murray:—I thank you for the honor of conferring upon me the highest office in your gift. I will do all in my power for the best interest of horticulture throughout the great State of Missouri.

Mr. Van Deman:—I wish to say to the members of this Society and to all the horticulturists of the State when all has been done, there are two men in this hall that the people of the State, and of the United States, will never be able to thank enough for their labor. I know no two persons outside my own family I love more. They are J. C. Evans and L. A. Goodman. They have been the instruments of bringing the greatest honors and benefits to the State of Missouri.

Secretary Goodman:—I thank you for the honor of reelecting me to the office of Secretary of the State Horticultural Society. It has been my ambition to help make the great State of Missouri what it is, especially in its fruit interests.

N. J. Colman:—I labored four years with Mr. Van Deman, and I think in honor of the man and his work he should be made an honorary member of this Society.

Carried unanimously.

J. C. Evans:—I suggest that Col. Colman come to the stand and give us a word of encouragement.

Col. Colman:—My dear horticultural friends, I do not know but I owe you an apology for my remissness in attending the meetings of this Society. Its interest and welfare have ever been dear to my heart. The meeting of another association national in character is held on the same day. I was a member of the executive committee of that association and had my duties to perform. This is my excuse, and my only excuse for not meeting with you. I left that duty last night only partially performed to meet with you again.

It was your indorsement that first gave me encouragement to hope for the appointment as Commissioner of Agriculture at Washington. I wanted to fill that position because I believed it had not been filled by a practical man, and that your interests had been neglected. I succeeded by your aid in getting the appointment. At that time the Department of Agriculture was at a low ebb. It was the ridicule of the newspaper correspondents at Washington. They made all sorts of fun of the department; and they commenced firing their squibs at me, but when they found that I understood the duties of the position they encouraged me and I had their support.

There had been no Division of Pomology. It was my ambition to make such a department that would be an honor to the country. Among my first correspondents was a letter from H. E. Van Deman recommending such a department. All of those who had been in the office before me were afraid of innovation. Members of Congress were opposed to it. When finally the Division of Pomology was established I looked for a man to fill it. Mr. Van Deman was a disciple of Dr. John A. Warder of Ohio. J. C. Evans recommended him and I appointed him. He held the place for eight years and did a great deal of good. He gathered information from all parts of the Union. I was surprised that one of my successors had left him out. I hope he may again fill the position, though he is not of my politics.

I established the Division of Vegetable Pathology, and appointed a man whom you know, B. T. Galloway. He has filled it most creditably.

I was responsible for the establishment of the Experiment Stations throughout the United States. In my paper I took the ground that the farmer, individually, was not able to experiment, and that there should be some stations to carry on experiments for the benefit of the State. I called a convention of representatives from the Agricultural Colleges to consider the establishing of experiment stations, and at that convention I made an address setting forth the causes that had induced me to call the convention. We had a large meeting. I was made president. The matter was discussed, and a committee was appointed to prepare a bill, put it before Congress, and to push it through. We prepared the bill and then issued a call for another convention of Agricultural Colleges to consider the bill section by section. When the bill was completed it was put into the hands of Mr. Morrill, of Vermont, in the Senate, and Mr. Hatch, of Missouri, chairman of the committee on agriculture in the House. Neither of them had ever seen the bill before it was given to their charge, yet in the history of the department Mr. Hatch is given all the credit of being the father of the bill. He passed it through the House and it is properly called the Hatch bill, but he had nothing to do with originating it. I merely make these statements to show that having received your indorsement I was constantly doing what I could to advance your interest in that line, and having received your further indorsement I feel I have been paid for coming here. No other State can make such a showing as Missouri. If my life is spared I hope to meet with you often and my heart will always be with you. I want you to make Missouri the most beautiful and the best State in every respect in the Union.

Sam Miller:—Before I came to Missouri, I contributed to Col. Colman's paper, then called the Valley Farmer. I little thought then of coming here. Reading his paper made me come to Missouri. I think it is the best horticultural and agricultural paper in the United States. If you don't get *Colman's Rural World*, you ought to have it.

Mr. Mansur:—Col. Colman has made some remarkable statements in his address. He should have credit for his long and ardent labors in the cause of horticulture and agriculture.

Mr. Van Deman:—I am perfectly aware that every thing he has said is true. When I read that history I was ashamed that he had not been given the credit due him.

C. C. Bell:—I would like to see the history of these Experiment Stations corrected. I move a vote of thanks be tendered to Col. Colman for the address he has given us.

The motion was carried.

Col. Switzler:—In one sense I am not a member of this Society. In another respect I am a member of every Society whose object is to promote the welfare of the State of Missouri. I have been standing up for Missouri for more than fifty years, and I am still standing up for Missouri. In reference to the statements of Col. Colman, I will say that I was a member of the convention of representatives of the Agricultural Colleges. I represented, in part, the Missouri College. Col. Colman will remember that I made a motion to have him made President of that convention. He made a forcible speech advocating legislation to establish experiment stations in every State in the Union. He is the author of the idea of Experiment Stations as we now have them. I make these statements with great pleasure, because I have a distinct recollection of the matter. He ought to thank me for nominating him.

Col. Colman:—I would not pluck one honor from Mr. Hatch. He indorsed the bill and was entitled to the honor of having it called by his name. He would say if he were living that he had nothing to do with its formation. It was passed nearly as it was put into his hands.

Mr. Follet:—I am glad this subject has been brought up. This Society can not afford to lose the honor of having one of its members originate this bill. These Experiment Stations are in the van of the age. It is worth as much to me as if I could hire fifteen or twenty men and have them experiment for my benefit. I move that a committee be appointed to draft a resolution giving Col. Colman due credit for his work.

Col. Colman:—I don't want any resolutions passed. I had no expectation of talking on this or any other subject when I came here. Again I say I don't want any resolution of indorsement.

Secretary Goodman:—It is the right of this Society that these matters should be corrected and put on record.

The President appointed as a committee to report on this matter at the last session:

J. B. FOLLETT,
H. J. WATERS,
C. H. DUTCHER.

Invitations for the next meetings of the Society were presented.

G. A. Atwood read the following letter and spoke urgently for Pierce City.

Pierce City, Mo., Dec. 5, 1898.

Mr. Geo. A. Atwood, Columbia, Mo:

Dear Sir:—Owing to the fact that it is impossible for any of us to attend the meeting at Columbia, it is the unanimous desire of our people that you represent us in asking for the summer meeting of the State Horticultural Association at this place. guaranteeing, of course, all the favors desired by you and Mr. Nelson upon your visit here. Truly Yours,

R. N. EDWARDS.

Messrs. Nelson and Tippin also spoke in favor of the summer meeting at Pierce City.

In the name of his Society K. B. Wilkerson again extended the hospitality of Mexico for the next annual meeting.

Mr. Boucher gave the invitation from Moberly.

The Secretary read letters from Kirksville asking for the forty-second annual meeting.

Kirksville, Mo., Dec. 6, 1898.

Mr. L. A. Goodman, Columbia, Mo:

Dear Sir and Friend:—On account of sickness in my family I will not be able to attend the meeting this winter. I inclose you a letter from our Commercial Club asking you to come to Kirksville for the next winter meeting. I hope it will be considered favorably. Yours Truly,

ARTHUR PATTERSON.

OFFICE OF THE KIRKSVILLE COMMERCIAL CLUB.

Kirksville, Mo., Dec. 5, 1898.

Mr. Arthur Patterson, Kirksville, Mo:

Dear Sir:—We, by authority of the unanimous vote of the Kirksville Commercial Club, ask that you invite the State Horticultural Society of Missouri to hold their next annual session in this place.

You will please say to them that we will heartily welcome them.

H. T. BAIRD, Pres. K. C. C.
W. F. ENGLEHART, Sec'y. K. C. C.

Mr. Bell made a motion to refer the decision to the Executive Committee, which was carried.

Washington, D. C. Dec. 1, 1898.

Mr. L. A. Goodman, Secretary Missouri State Horticullural Society, Westport, Mo:

Dear Sir:—The preliminary arrangements for the biennial meeting of the American Pomological Society are now being made. It is expected that the session will be held early in September 1899, probably at Philadelphia. As the Grand Army encampment occurs there at that time a low railroad rate can be secured, which should insure a large attendance of horticulturists from all parts of the country.

As it is expected that this meeting will be one of the most important ever held by the Society it is desired by the Executive Committee that as large a representation as possible from the horticultural societies and kindred organizations of the several states shall be present. It is believed that the large and varied program which will be presented, together with the opportunity afforded for the discussion of questions of importance to the horticultural and pomological interests of the country, and on which it is desirable that united action should be taken, will make such attendance both interesting and profitable to those who attend, and through them to the societies which they may represent. It is hoped, therefore, that the several horticultural societies will arrange for representation at this important session.

The subject is called to your attention at this time with the request that it be submitted to your society at its annual or other proper meeting for such action as your society deems advisable. Fuller notice of the meeting, with announcement of exact date and place will be made at a later date. Meanwhile the Executive Committee will be pleased to learn what action, if any, is taken by your society and what representation the society is likely to have at the meeting.

Suggestions in regard to subjects for discussion in which your state or society is particularly interested, will be thankfully received by the committee and will be given due consideration in making up the program.

The exhibition of new fruits of superior excellence is solicited and the Wilder medal will be awarded to such as merit the approval of the Committee on Exhibits as at former sessions.

In acknowledging receipt will you kindly send list of officers of your society for 1898-99, and oblige.

Yours very truly,
WM. A. TAYLOR, Secretary.

Dean Waters said the editors would visit the Society at four o'clock.

Christian and Stephen's Colleges asked the Society to take charge of their grounds and have them planted by a landscape gardener under the care of the Society.

An invitation from Prof. Updegraff was extended to those wishing to visit the Observatory.

Columbia, Mo., Dec. 6, 1898.

Dear Professor Waters:—I should be glad to have any of the members of the Horticultural Society, who may desire to do so, to visit the Observatory on any night that may be convenient to them. The Great Nebula in Orion can be seen very well now with the telescope about 9 p. m. when the sky is clear.

I would extend the same invitation to the gentlemen of the Press Convention also.

Very truly yours,
MILTON UPDEGRAFF.

P. S.—It will only be necessary to let me know a few hours before hand in case any should desire to visit the Observatory. M. U.

OBSERVATIONS IN THE ORCHARD.

In writing on "Observations in the Orchard," I do not for a moment believe that I can give any new ideas or methods of planting, caring for, or growing an orchard. There has been so much said and written about the proper way to plant, prune, and cultivate an apple tree, by so many horticulturists from different parts of our state and country which seems contradictory to the man planting his first orchard that he is forced to think the same care will not give the same results in different climates and soils.

As my experience has mostly been with the rich prairie soil of LaFayette county, the results I have obtained might have been different on poorer soil.

FALL OR SPRING PLANTING? The first trees I planted in Missouri was in the fall of 1879. I dug great deep holes, three to four feet in diameter; in these holes I first put a liberal supply of well-rotted stable manure, and covered that with earth until the tree would be about two inches deeper in the ground than it had been in the nursery row. The following spring I planted an equal number of trees beside the others, but did not dig holes any larger than the roots required, and mulched them heavily with the same kind of manure the others had; the result was that the young roots made straight for the manure in both cases. We had a great many severe storms that summer, and with every storm my spring planting would blow over, the young roots being all on the surface, while the fall planting stood up; I have never manured young trees on the surface since that time.

I also planted a few root grafts where I intended the trees to grow, with very satisfactory results, so far as the tree is concerned, but too much work to keep them clean, but, if there is any virtue in the "whole root" fake, you have it.

PRUNING:—Some advise cutting back the top as much as the roots are cut back. I have tried that but do not advocate it as I get the best tree in this section by planting it as it comes from the nursery, cutting out only cross limbs. The pruned tree nearly always throws out two or more shoots where you cut a limb, and the tree in general does not look as well as that not cut back when planted. If you will go through your young trees two or three times every summer, for four or five years and rub off all buds where not wanted, very little pruning will be necessary.

PROTECTING TREES FROM BORERS: The wooden wraps are probably as good an all-'round protecter as any thing we have yet, but they will not keep all borers out. I first wash the trees with "Kerosene Emulsion" with a little crude carbolic acid in it. Dip your wrapper for about two inches on the lower end in coal-tar, put it on, press it about one inch in the ground, and you will not have any borers or woolly-aphis on that tree that year, but to be sure, take your wrapper off every spring and wash the tree as before, and no borers will trouble you.

If moles or mice trouble you, soak some corn in arsenic and drop a little in the mole runs, and moles and mice will disappear; it is often said "moles do not eat corn." I do not know whether they do or not, but if you will try the above remedy you will soon be rid of both the mole and short-tailed mice.

Four or five years after planting is as long as it is profitable to cultivate the ground, Get the ground in good shape for surface drainage and sow in clover, if weeds get in, cut the ground up thoroughly in early spring with a disk-harrow, and sow again in clover; cutting the crop three or four times during the season, and leaving the crop on the ground for a mulch. In that way you will keep your trees vigorous and healthy. We never get much fruit here until the trees are planted seven or eight years.

The kind and age of trees to plant is of the utmost importance to the man planting an orchard, for all kinds of apple trees will not do equally well in the same soil. The Ben Davis, Gano and Jonathin are the most profitable here. Willow-Twigs, Missouri Pippins, and York Imperial blight badly, although the York Imperial seems to grow best on damp (not wet) land. I have planted one, two, and three year old trees, and have always had best success with those three years old; with me they grow better and stand a drouth the first year better than younger trees and will begin to bear fruit from one to three years sooner than those two years old.

As soon as trees begin to bear fruit the codling-moth and other pests are sure to appear and will destroy a great deal of fruit in spite of every effort to check their ravages; I have tried torch lights when the trees were in bloom, and followed the lights with thorough spraying, and think this course will result in killing the first crop. I could see very few wormy apples until about the first of August, when I would find a great many apples stung on the side, and, in fact any place but the blossom end. I did not for several years know that it was a second crop of moths; many of them I am sure came from neighboring orchards not sprayed.

I know of no way of successfully destroying this second crop, and would like to know whether or not any one has tried kerosene emulsion, to keep off this second crop of moths, and if so with what results? Also, would it injure the fruit or leaves at that time of year? I do not warmly advocate the torch light, as in my experience it has proved beneficial to only a limited extent; if the nights were warm and still when the lights were first put out and the moths just appearing, considerable numbers would be killed; but when they commenced to lay their eggs they would not take any notice of the lights, but seem to be attending strickly to their own business. I also notice that the moth makes its appearance some years a good deal earlier than others, and that the "Round headed borer" does not always enter the bark at, or a little above the ground; this year fully 75 per cent of the young larvae have entered the bark from one to two inches below the surface and unless the earth is removed you could not find them. What is the cause of their entering the tree below the ground this year?

The almost total failure of the apple crop this year has been the subject of many ably written articles in our news papers; some writers contending that the drouth last fall prevented the buds from properly maturing, others, that a wave of electricity passed over this country and injured the buds or blossoms, etc., etc., but I firmly believe it was caused by the heavy rains we had when the trees were commencing to bloom, and the continuous rainy weather until all the pollen and petals were beaten off before they matured.

My reasons for believing the heavy spring rains the cause, are that the Lansingburg Pippin trees which bloomed about five or six days before the Ben Davis, and before it commenced to rain, had a fair crop of well-developed fruit; and Jenneting trees that came in bloom after the heaviest of the rain, had a good many apples, while nearly all other varieties had none except some trees of Ben Davis east of the Lansingburgs, which bore some knotty fruit, and one Ben Davis tree standing in a Lansingburg row had a good many pretty fair apples.

If the drouth last year injured the buds, and some claim, how came these trees to have good buds? Or, on the other hand, if the crop failure was caused by an electric wave how did the Lansingburgs escape? We need dry weather, with a light wind, when trees are in bloom; just breeze enough to carry the pollen to every fruit bearing bloom to insure a good crop; for, as every fruit-bearing tree puts forth all its strength to mature its seed, it is necessary that every seed be properly fertilized; if it is not you will find a defective, mouldy core in many otherwise good-looking apples; such fruit will always be the first to spoil and should not be stored for winter use.

HEAVY PRUNING OF OLD TREES will cause them to make extra efforts to produce a heavy crop for a few years, but it will be at the cost of your trees; the wounds made will never thoroughly heal; even if new wood grows over the cut you will find a rotten place in the tree which will continue to increase until the tree dies.

The first indication of the tree's decay will be a growth on the body of the tree near the ground, of a toad-stool looking substance which will continue to increase, even after the tree is dead, and, if there are any large roots near the surface it will sometimes grow on them. I never cut any wood from an old tree except dead or broken limbs. Clean up all grass and weeds during winter or early spring and burn them; I think it pays me, for if there are any apples in this neighborhood I always have them. WM. P. KEITH, Mayview, Missouri.

ORCHARDING.

The above subject has been gone over time and again, and I think our worthy secretary selected the wrong man to write about the above mentioned subject, but I can only fail in the attempt of trying to give my observations.

In the first place what is orcharding? It is not simply to plant the trees out and the thing is done. Too many construe it in that light and make a failure of it. For successful orcharding there are a number of very essential requisites, first, a person who hasn't a love for the calling is better off out of it entirely. Now as for land, it matters not what kind of soil you have for your orchard but the higher the ground the better on account of being less liable to be damaged by frost. I prefer rather thin soil as it bears fruit a little quicker and of better color and somewhat sweeter than when planted on rich soil. I think to get the best results the distance should be about twenty-five by thirty feet. First set stakes and mark off with a single shovel plow, as much cross-ways of the hill or slope as possible, then cross it with a lister plowing about eight inches deep with the subsoiler running seven inches deeper, this will make a drainage of fifteen inches deep for the water to escape. Subsoiling all the ground as some prefer is only time fooled away as the ground will be as hard as ever before the roots can come out and enter it. Then the tree should be wrapped with tough paper up to the branches and tied tight at the top so as to keep out the borers and the paper should go twice around the tree and into the ground two inches and a half. If the paper is of good quality it will last through the next winter and keep the rabbits from girdling them. If you keep the borers out the first season they will not bother much after that. I think corn is the best crop that can be raised in the orchard for several reasons, first, it gives the trees thorough cultivation, second, it shades the trees and keeps the hot sun from scalding them. In about five or six years seed it to clover and you can soon have two crops growing on the same ground. Next I think trees should be headed not too low nor too high. About two and a half feet high gives you a chance to tie them up to protect them from rabbits and also to pick up the falling apples. I also trim the tops back in proportion to the roots and I find that a much greater per cent live the first year of planting, then I don't do much pruning after that, I think we in north Missouri should plant our commercial orchards of Jonathan and Ben Davis about half and half with a small variety orchard for family use. E. C. DOAN, Ravanna, Mo.

GROWING PEARS.

The subject, "Does it Pay to Grow Pears?" would be better stated, "Can Pear Growing Be Made Profitable?" and I shall try to treat it in that light. My experience has been limited and expensive. The first ten years were not only costly and discouraging, but disappointing. "Experience is a dear school," but even a "fool may learn therein" and common sense may profit thereby.

"Can Pear Growing be Made Profitable?" I presume the discussion is designed especially for our own state. I answer, "Yes, most assuredly," with a judicious selection of varieties adapted to the locality, careful attention and constant study of the habit, condition, growth and needs of the tree, and properties of the soil and location of orchard. I think it can be made, and is as profitable as any of our large fruits.

The tree is naturally hardy, comes early into bearing, gives a good crop more regularly, requires less ground, less fertilizer, less labor and no more attention and care than either the apple or peach. The fruit brings as much per pound as the peach, and an average of four times the apple; is always in demand and of ready sale.

The tree is not more subject to the fatal disease, "blight," than the apple and peach to their ever-present destroyers—borers and sun-scald. Blight—"frozen sap blight"—the incomprehensible and unconquerable foe of the pear is not more to be dreaded than "curled leaf," yellows and borer in the peach, or twig blight, fringe-winged apple bud moth and borer in the apple. These are as destructive to peach and apple if let alone as blight to the pear. Eternal vigilance and ever-exterminating, which never exterminates these enemies, are the only bulwarks of apple and peach orchards. The broken back and worn out pants-knees are clear evidence of the "low down" business of killing worms.

The pear tree is not subject to borers and it is easier to cut off a blighted branch standing like a man than to cut out borers on "all fours," rooting around the collar like a hog to find them. One is about as sure death to the tree as the other if let alone. We can plant twice as many pears as peach, and six to eight times as of apple. They require no more care and cultivation and less pruning until they come into bearing, and then cultivation ceases. Not so with the peach and apple. Dwarf, or dwarf and standard together may stand on 10 feet square, or 435 to the acre. (Quinn on "Pear for Profit.") At 15 feet apart 193 peach, at 20 feet 108. And apple at 25 feet, 69, and at 30 feet, 18 trees may stand on an acre, with no more room than dwarf pear at 10 feet.

The ravages of blight nearly destroyed my orchard, and in dispair I let it alone, while I wept tears as big as Ben Davis apples and hard as McAfees, but it would not let me alone. Part of it grew up in bluegrass sod and part was cultivated as little as possible to keep it in clover. (Alsike mostly, for bee culture.) There was less blight and I had forty or fifty trees left out of over four hundred injured pretty badly, but they never gave up and continued to bear pretty good crops. The average for sixteen years, (three almost failures) was about seventy-five cents per tree, or at the rate of $300 per acre, on about an equal number of dwarf and standard, exclusive of use in two families and many given away. The varieties were: Standard—Bloodgood, Bartlett, Flemish Beauty, Tyson, Seckel and Lawrence. Dwarf—Duchess, Louise Bonne and Vicar, The Bloodgood is long coming into bearing but is a steady prolific bearer, ripening in July, of medium size and fair quality; tree among the most hardy. Bartlett and Seckel are too well known to need any comment except both are profuse, regular bearers of fruit of first quality, that always commands the top price. The Flemish is a splendid bearer of very large beautiful fruit of superb quality; in season with Bartlett. Tree hardy, has less blight than any except Lawrence, Seckel and Bloodgood, but dies from sheer exhaustion at the age it should be at its best; the most beautiful pear grown. The Tyson is thrifty and hardy, late coming in. Every third is an "off year," succeeded by a partial crop, while the third yields all one could desire. Quality good to fair. Size above Seckel. Not desirahle to plant. Lawrence is rather open-headed and spreading. Hardier than Bartlett. Bears regularly fine crops of medium to large, rich, jucy, prime fruit. Season October, ripens rapidly and must be cared for promptly and extremely careful. The Duchess wherever seen speaks for itself and laughs at commendations. The Vicar is a good bearer of large fruit of fair quality and may be kept in cellar until the middle of November. Louise Bonne is among the best bearers. Fruit of prime quality. Tree open, spreading with few main branches and bears its fruit like the Dominie apple—making "ropes of pears." I have taken twenty-three marketable pears off a single branch twenty-eight inches long. I know it stands on the rejected list of many growers.

Were I planting again (and I would were I younger) I would plant very few varieties and nearly all dwarf. I would select high, gravelly, rolling, well drained land, and if practicable would tile drain. Of standards—Bartlett, Flemish, Seckel, Lawrence. Dwarf—Duchess, Louise Bonne and Vicar. I would plant Keiffer largely, either dwarf or standard, as has proved best. Not having tested it I can't say. Many other varities planted have either proved profitless in fruit, or

"Have gone to decay Ben Bolt,
And a quiet now reigns all around."

Where to buy trees, how to plant, cultivate and care for the orchard, before and after coming into bearing, are separate subjects and do not come within the scope of this paper.

If I provoke discussion so as to bring prominently before our people the real value of this fine fruit and thus aid in developing the vast capacity as a pear growing, as well as apple and peach producing, State second to none, then this paper will prove opportune. If not, why not?

DAN CARPENTER, Barry, Mo.

LOCAL FRUIT SHOWS.

The local fruit show or exhibition of agricultural products as conducted by the people was first inaugurated, as far as this part of the State is concerned at Meadville, in Linn County, about twenty years ago. At that time a few enterprising business men put their heads together and concluded to offer a few premiums in goods for the best display of farm products, which were exhibited in the schoolhouse yard. The venture proved such a success, both in the display and the interest manifested, that the occasion naturally came to be observed annually. In a few years the interest in the "Agricultural Picnic," as it was called, had increased to such an extent that the schoolhouse yard was altogether too small to hold the crowds who came in from all quarters. A beautiful grove adjoining the town was then secured, in which has been held for many years one of the most popular one-day gatherings of farmers of which I ever heard. In this gathering the comfort and welfare of the people is the first consideration.

Money is a secondary consideration. In fact it is not a money-making scheme. Only enough money is wanted to pay expenses, and the institution has long since become selfsustaining, i. e., paying all expenses incurred except premiums which are donated by citizens.

That the local fruit show or agricultural exhibit is taking the place of the county and other fairs is evident, and that they serve the interests of the people better is also evident. In the former, evils have been left out that were conspicuous in the latter. Horse racing has been left out either for the reason that people are becoming more refined or are getting tired of such sport and do not wish to go to the expense of making race tracks and offering purses for competing horses. In these new and truly agricultural gatherings, gambling, betting, drinking and swearing is reduced to the minimum. The honest, law-abiding tiller of the soil ought certainly to be thankful that the day has come when he can spend a day at an agricultural exhibition, with his family, without fear of their morals being corrupted, their modesty shocked, or their pockets picked. As might be imagined, this annual exhibit of agricultural products has been a great benefit to Meadville and the farming community surrounding it. It has begotten a more friendly, unselfish and neighborly feeling. Neighbor Jones offers $1 for the biggest pumpkin and neighbor Brown takes it. Perhaps neighbor Brown offers the same amount for the best plate of apples and neighbor Jones or some other friend takes it. It has shown us what our country is capable of producing.

The truly wonderful displays are often astonishing to all. The exhibit of corn this season—poor corn year though it was—numbered sixty-nine entries. A business man from a neighboring town told me the following day that during his thirteen years consecutive attendance at the St. Louis fair he had never seen anything approaching it. It has been one of the best advertising mediums. Many people from a distance arrange to visit their friends here so that their stay shall include the fair and picnic. The gentleman referrred to above, who, by the way, has had large experience in a similar fair and picnic at his own town, said he did not doubt but there were fifty prospective land buyers on the ground during the day. It is an incentive to better methods in stock growing, dairying, fruit growing, and all branches of farming.

When a fine article is exhibited everybody wants to know how it was produced, and much discussion is indulged in over the exhibits in all departments. In the fruit department especially there are many questions asked. I have had the honor of presiding over that department for several years and have been kept busy answering questions, as best I could, on best varieties to plant, when, where and how to plant, prune, spray, etc. I am glad to notice that these gatherings "of the people for the people and by the people" are becoming more popular every year, and Meadville modestly claims the honor of having first introduced them. Recently they have taken the form of street fairs, but the aims and results are the same. Brookfield, in this county, after a failure with her horse racing fair, held a mammoth one-day street fair and flower parade, which was a gorgeous success. Cameron also held a three days street fair, and Quincy, Illinois, not to be outdone by us Missourians, closed the fair season with a four days street fair.

May the good work go on.

G. P. Turner, Meadville, Mo.

GRAPE CULTURE.

First. Plant good native varieties, and none but those that have been thoroughly tried by practical wide-awake vineyard men or thoroughly tested by nurserymen of this locality.

Second. Plant early varieties on a southern or southwestern slope, and late varieties on western or northwestern slope; for these are intended for wine-making.

Third. Select a very steep slope, and poor land, never rich, and never manure the land for a vineyard.

Fourth. Run the rows due north and south. Put the rows ten and twelve feet apart, and the plants six or eight feet apart in the row.

Fifth. We should experiment on the distance vines should be trellised from the ground. California having a dry soil the vines are trained on the ground. We have a wet soil, hence should keep them off the ground.

Sixth. The manufacture of pure grape wine is both difficult and expensive. I consider the use of the grape through the summer and fall season the most healthful to the people.

J. G. Lung, West Plains, Missouri.

QUESTION BOX.

Do the nurserymen who advocate whole root grafting use one seedling for each tree, not cutting into sections?

Answer.—They use the first cut of the seedling, grafting at the crown, and using about eight inches of root.

What length of seedling is the best used for grafting the cion? And is the second cutting as good as the first?

Answer.—There is very little difference in the growth of the first, second and third cuts.

Is there on record a Black Ben Davis apple, if so, where is its origin?

Answer.—The Gano, grown on the rich lands of Washington county, Arkansas, colors up so highly that it is sometimes called the Black Ben Davis.

Is there a Bokara Peach No. 10?

Answer.—None that the society knows about.

FIFTH SESSION.

Thursday Afternoon.

Subject.—Stone Fruits; Orchards and Insects.

EXPERIENCE IN PEACH CULTURE.

The worst drawback to peach culture I have met with has been in procuring trees true to name. My last order for peach trees was for 50 Mt. Rose, 50 Elberta, 50 Salway and 50 Henrietta. These trees all bore fruit the second season. One hundred and thirty of them bore a medium-sized free-stone peach that ripened its fruit about three days after Elberta, two more of them bore a fair-sized white free-stone that ripened its fruit about the fifteenth of September. The balance of the order, sixty-eight trees, was about equally divided between Elberta and Salway. This may have been a mistake on the part of the nurserymen, but I hardly think it possible that such a mistake could have been made accidently.

Among other drawbacks to peach culture I would mention peach yellows, curl-leaf and borers, but these can be fought and kept under control. In fact I consider them as a kind of blessing in disguise, for if we had none of the drawbacks to peach culture, growing peaches for profit would soon be a thing of the past.

VARIETIES.

My experience is very limited in regard to varieties. Were I to plant out a commercial peach orchard in Cole county, now, with what experience I have had with varieties, I would plant Mt. Rose, Family Favorite, Elberta, Old Mixon Free; Crawford's, late; Salway, Picquette's, late; and Henrietta.

LOCATION.

With us on high white oak ridge lands is the best. If the land slopes slightly to the north, so much the better; new land that has been cultivated the previous year in corn or some hoed crop is the best. Among a few peach trees that I planted out four years ago last spring, there were five Elberta trees planted on land, that had never been in cultivation, with a southern exposure, where there was not over eighteen inches of earth on top of the solid rock. From these five Elberta trees I have sold thirty dollars worth of fruit besides what was used at home. Spring I consider the best time for transplanting peach trees.

PRUNING.

When transplanting I cut off all side branches and head back main stem to within two and onehalf to three feet of the ground. I allow from four to five main branches to start from this stem or body, and rub off all others. I would start the first limb at least one foot from the ground, and allow no two limbs to start opposite each other, start them out in as many different directions as there are limbs.

The first year after transplanting I cut back about blooming time from one third to one half of the previous years growth, this I continue to do each spring until the tree comes into full bearing, after this I do but little if any cutting back unless there is a failure of the peach crop, then I head back to where the limbs are from one and onehalf to two inches in diameter. This method gives more and better wood for the next year's crop and keeps trees in better shape. I keep center limbs well thinned out and the outside ones well up from the ground so that the weight of fruit will not bring the limbs down on or too near the ground.

CULTIVATION.

I believe it was that eminent horticulturist, Chas. Downing, who once said, were I to preach a sermon on agriculture my text would be "Stir the Soil." This I consider one of the most important factors in successful peach growing. As soon as the ground will work well in the spring plow the ground in the orchard and harrow until it is in fine tilth. Hoe around the trees for best results. The orchard should be harrowed at least four times a month, up to and including October. With hoe or garden rake keep the ground clean and finely pulverized around trees. This continuous surface cultivation will retain the moisture during the dry hot, weather we usually have during July and August and keep up a continuous wood growth during this peroid and thus prevent the fruit buds from maturing too early in the season. The hot, dry weather the last part of August and the first part of September checked the wood growth on our peach trees and allowed the fruit buds to mature. The warm rains during the latter part of September and the first part of October caused the peach buds to swell, and our chances for a peach crop next year are not good. This method of cultivation will not do for hill sides where the ground washes badly, but hill sides are a poor place for a peach orchard and should be avoided when possible.

FERTILIZERS.

Hard wood ashes make one of the best fertilizers for the peach. Cow peas sown in drills or planted in hills about three feet apart and cultivated until they nearly cover the ground, and turned under with a breaking plow when they are in full bloom and the ground harrowed thoroughly, and the harrowing continued for each month the balance of the season, will do much in keeping up the fertility of the land in the orchard.

If there are no heavy rains to run the ground together, after ceasing the cultivation of the peas better results will be obtained by allowing the peas to ripen before turning under. Keep soil loose and finely pulverized around the trees at all times during the entire growing season, the object being to keep a finely pulverized surface to retain the moisture. If possible give each bearing peach tree one bushel of hard wood ashes each year, and keep the borers out of the trees, then cut so that the peaches will be from three to four inches apart and you will have fruit that will sell and command the highest price paid on the market. For peach yellows cut and burn as soon as you see a tree affected with the disease. For curl-leaf spray with Bordeaux mixture. For borers I use a mixture recommended by Miss Mary E. Murdtfeldt: 1 quart home made soap, 2 quarts water; add washing soda until the mixture has the consistency of paint. Remove the earth from around the base of the tree and apply with a paint brush about the first of May and again about the first of June. I apply the mixture to the entire body and on the lower part of the large limbs. If this is thoroughly done you will not be troubled with borers.

ALBERT J. DAVIS, Jefferson City, Missouri.

PEACH GROWING IN NORTHWEST MISSOURI.

Here has been the home of the apple. Peaches were a failure so often that people took no interest in trying to grow them here. We would plant out a few trees and have a fine prospect for fruit, then came a blizzard and away went fruit, trees and all. We planted a few trees again hoping that the season might change. It did and we had a crop of peaches for the past three years. This last year the crop of peaches was good in some orchards, while others adjoining were bare of fruit. The trees had curl-leaf in the spring; some dropped their leaves and all their fruit. I examined my peach trees last spring and found the borers in them, especially on my seedlings; and these, also, had the curl-leaf the worst. My budded trees bore a good crop, with the exception of Bokara No. 3, which blossomed full the last two years, but failed to ripen a peach. The Alexander set very full of fruit, but in June they began to rot and by the Fourth of July all on the tree were rotted. Mountain Rose did the same and Elberta was almost a failure; they had only a few blossoms but bore some fine specimens. I think we are too far north for this variety; it is not hardy enough in the bud to ever be a standard peach here. The Champion is a very fine peach here and promises a fine crop of fruit. Crosby is a fine new sort here, and gives great promise. Heath Cling is one of our stand-by's. We get fruit from this if there is any in the country. Yesterday I examined the buds on some of my trees and found those on Elberta all killed, while those on Heath were all alive; a few dead ones were found on Amsden June.

James Langdon, living near Mound City, Missouri, had 400 Heath Cling planted four years ago in the rows with his apple trees, and this past year he sold $1,200 worth of peaches to men from Iowa, who came and took them away in wagons. There have been more peach trees planted in '97 and '98, than in the ten years preceding.

Since 1852, I have been experimenting with fruit here in Missouri. There is no use of trying to grow any but the hardiest varieties of peaches so far north as this. Peaches always get killed in the bud. Plant the hardy kinds on high land; plant trees one year old from the bud in the spring, just as the leaves start out. Plant sixteen feet apart each way, and every eight rows plant twenty-five feet, so that you can have a drive way to haul out the brush and the fruit. When planting the trees trim to a whip, and when they begin to grow prune off all the lower limbs two feet from the ground, and cut back all the long ones so that the tree will have a round head; for if you let the long branches grow they will split down when full of fruit. Look after borers and rabbits. Plant potatoes in your peach orchard for two years, and if the land is not rich give plenty of barn-yard manure, and each tree a half bushel of leached ashes.

C. SHULTS, Craig, Holt county, Mo., December 2, 1898.

DISCUSSION ON PEACHES.

J. H. Marion:—I would like Mr. Davis to tell from whom he got those trees.

Mr. Davis:—I don't like to do so.

Professor Irish:—The speaker said spring was the best time to plant peach trees. This accords with my experience. One year I took seven or eight varieties of apples and five of peaches, and planted them about the first of November. I took them up on the first of December. The apple tree roots had grown more or less, but there was no growth on the peach. The roots had not calloused. In the spring three peach trees were planted. The fall and the spring set trees were taken up in June. There was no difference in their growth. It is safer to plant in the spring. With apples, I think it better to plant in the fall, even if they do not grow so well there is more time in the fall.

Mr. Kercheval:—I have planted a thousand peach trees on rough land. If I cultivate thoroughly I will loose my soil. What is best in such a case?

Secretary Goodman:—Cultivate along the rows; if too steep, cultivate only around the trees. It is the lesser of two evils. I would like to discuss the best varieties for a few minutes. Tell in what part of the State you live.

Mr. Davis:—One object I had in planting in the spring was, I could prune at the same time. It is not good to prune peach trees in the fall; the wood will die on the end.

Mr. Van Deman:—It is better to let the cow peas stand in the orchard till spring. It is not well to plow them under when green, or in the fall of the same season. Left on the ground they catch the snow, prevent washing and lose nothing of their fertilizing value. The nearer maturity they get, the more nitrogen you get. If you plow them under green you fail to get much of their value as a fertilizer.

J. C. Evans:—The gentleman is exactly right in that respect. We never got any benefit from plowing them under green.

As to the best varieties of peaches, we started with twelve or fifteen, but have cut them down until now I would not plant more than six. I would name Family Favorite, Elberta, Picquets' Late, Salway; and, for later, Bonanza a Whitefree Stone.

Col. Colman:—Does the the cow pea give you any benefit?

J. C. Evans:—We have as many as six hundred acres, and we have tested them till we are convinced they do give us a profit. We have skipped blocks and have demonstrated to our own satisfaction the advantage of growing them. We cultivate thoroughly in the spring when the land needs the sunshine; and the peas shade the land in the hot summer weather. I broadcast or drill them; there is no difference in the growth, but drilling takes less seed. I believe a crop of cow peas is equal to a liberal dressing of barn-yard manure. We try to keep our orchards up from the start—not letting the land run down.

Mr. Van Deman:—It is very important to know how and where to use cow peas. They will grow on land so poor that clover will not sprout. You can grow cow peas where you can not possibly grow clover. They take nitrogen from the air and form it into compound nitrogenous fertilizers. It makes something out of nothing, so far as the fruit grower is concerned. It does not add potash or phosphoric acid, but does add humus to the soil which is as necessary as anything else.

President Murray: — In North Missouri I would recommend Champion, Elberta, Crosby and Heath Cling of the best strain I could get. In '97 we had a full crop of Champion; no Elberta. In '98 we had a half crop of both. Elberta sold for $1.50 per bushel, so did Champion. We can not make any money on very early peaches. They compete with the later and better peaches from farther south. We once made money from early peaches, but can't now.

The Champion is two thirds gone when the Elberta comes in, and the latter is gone before the Crosby comes in.

Professor Whitten:—I would name Champion, Family Favorite, Elberta; and for early, Southern Early and Mountain Rose.

F. H. Speakman:—There are not more than three of four days between the ripening of Elberta and Crosby.

For local market, Oldmixon Cling is one of the best. Heath Cling does fairly well. Elberta does well. I want a later peach. Bonanza is recommended, but I don't know much of it. Do you find as good sale tor clings as free?

J. C. Evans:—I want only about ten per cent clings.

A. Nelson:—I would recommend, in order of profit, Elberta, Salway, Oldmixon Cling, Mountain Rose, Family Favorite.

President Murray:—Crosby was bearing it's first crop, which would make it later than on older trees.

Mr. Wilkerson:—Will not the Crosby be too small?

Mr. Murray:—Not if it is properly thinned and cultivated.

Mr. Wilkerson:—I find it of nearly the same season as Elberta. I would plant Champion and Elberta; no Crosby.

IMPROVEMENT OF THE PERSIMMON.

I am unable to tell much that is new on this subject, as very many of you are familiar with the persimmon so long known here, though it is new to those in the north. I have been somewhat interested in the persimmon for eight years. About that time I found a very large one on my place which aroused my curiosity, and I began studying and experimenting in a small way. I could not find any work on the subject, so you see it was no little task to begin. I first tried to propagate the persimmon by root cuttings, I took 1500 root cuttings, and got less than one dozen to grow. Then I grafted 250 as we do the apple, and not a single one lived.

Next, by the advice of our friend, Samuel Miller, Robert W. Furnas and others, I crown grafted on non-bearing trees. [Right here I will describe the non-bearing and fruitful trees. The opinion held by some that the male tree is needed to fertilize the bloom of the fruitful one is erroneous; both sterile and fertile flowers appear on the bearing trees; though occasionally, trees are found which do not bear fertile flowers. The fertile bloom always comes singly, one from each bud, while the sterile blooms appear in clusters of two or three to a bud, and are only half as large as the fertile blooms.] I also budded, and both these methods, budding and crown grafting, gave me good satisfaction. I have also found it does well by cleft or by splice grafting on two-year-old seedlings in the nursery row, so I think I have solved the problem of propagation. The time to top work old trees by top grafting or budding is just as soon as the bark will slip well. Many of us have old, barren or worthless trees that may be top worked with some good variety, and made to yield both pleasure and profit. Seedlings in the nursery row should be grafted as soon as the buds begin to swell, and in all cases with dormant buds or grafts.

This fruit, like all others, is capable of improvement, which can be accomplished in much the same way; first, by selecting seedlings of our choice varieties; second, by cross fertilization of our best kinds on the Chinese and Japanese varieties. The latter, our station workers here will do for us, if we will send them grafts of our best kinds. Prof. J. C. Whitten has already those two imported sorts growing. I have several seedlings of my large one from one to four years old, one of which showed some blooms this year, but did not fruit. I also have three seedlings of a black persimmon from Chariton county that are said to be very sweet and to have but few seeds. I hope some day to produce one as large as a Jenneting apple and with but few seeds. When we have thus succeeded in gaining a high standard for this fruit as to size and quality, then may we expect it to occupy a prominent place among our cultivated fruits.

Most of my planting up to this time has been from sprouts or suckers, but so many of them would not grow, the method was not very satisfactory. I tried planting in the spring and summer, but failed in a large measure, and have since found the fall to be the best time. If planted then and the roots are smoothed with a sharp knife, they will callous over and get well established, ready to grow the first warm days in the spring. To grow good seedlings, procure the seeds in the fall or early winter, and treat the same as peach pits.

Some will say, "What does this all amount to? They will sprout all over the place and are very troublesome to get rid of, for no stock will eat them." This is a mistaken idea. I have never had any stock on my place that did not eat both tree and fruit. If the land is prepared for a persimmon orchard as it should be for an apple orchard, and cultivated the same, the roots will go deep down and not be broken. I planted a sprout about eight inches in height five years ago in a row with the famous Ben Davis, have cultivated it every year since, and have not seen any sprouts yet. This year it produced about forty nice specimens. So you see that seedlings and sprouts will begin to bear in from four to five years, which is as soon as we can expect returns from other tree fruits. Seedless persimmons are scarce. My Marion at first had but few seeds, but now they are quite numerous, caused, I think, by taking so many root cuttings from the two trees I had in bearing. J. L. Normand, of Markesville, La., has a seedless one, and there is also one at Purdue University, Indiana, of which I will try to get grafts in the spring. Indiana must have the credit of publishing the first bulletin on the American persimmon. I will quote from this bulletin about handling the fruit. "The persimmon is not as perishable as some people suppose; it can be kept for several months. The fruits seldom rot, but dry up, and in this condition they have been kept till March and April by simply keeping them in a cool, dry place. They keep better, however, by packing them away in sugar in a jar or other tight vessel. They may also be canned by simply placing the clean, ripe fruit in a glass jar and pouring over it a syrup made of granulated sugar and water. It is not necessary to heat the fruit before canning. They may be used as occasion demands for making puddings, etc.

"The following recipe is given here for the benefit of those who have never eaten this fruit treated in this manner: Recipe for persimmon pudding.—One pint of persimmon pulp made very fine; one cup of sugar; one quart of sweet milk; three teacupfuls of flour; one teaspoonful of ground cinnamon; two teaspoonfuls of baking powder. Bake in a moderately hot oven for an hour, or until it is nicely browned. Cool and serve with cream. The fruit used for this purpose should be of superior quality, and perfectly ripe." The long keeping qualities of this fruit enables the grower to ship his fruit to distant markets without fear of loss from decay. Besides this, there are many other points favoring the introduction of the persimmon as a commercial fruit. First, the people are beginning to appreciate it, and this will soon create a demand for it. Second, it is rich and nutritious, and besides, has an astringent property which gives it a medicinal value. Third, the fruit is much sought after by the majority of people, many of whom are so intent upon getting it at any hazard, that they will climb the trees and tear out the whole tops. Fourth, they come into use after all other fruits are off the trees, and stored or put on the market. Fifth, the trees seldom fail to bear a crop, and are almost entirely free from the attacks of insects or fungus diseases. Last, but not least, the early ripening varieties command a good price in market, having been sold in the large cities for from six to eight dollars per bushel. Even in my home market, where they are plentiful, I have sold them at $3.20 per bushel. The persimmon is similar to the peach and plum in its choice of soil and location, but it will grow on almost any kind or soil, from rich bottom land to poor thin soil on the hilltops, so exhausted by continuous cropping that it is practically worthless. However, a warm soil well exposed to the sun will produce the finest fruit. The persimmon is very hardy in bud, as it does not bloom until about the first of June, when all danger of frost is past. I know of its being grown in Northern Nebraska, and the Indiana bulletin says it will grow and produce fruit as far north as the Great Lakes. In conclusion, I would like to ask, do not the real merits of this wild and long neglected fruit present a prospect that should raise the drooping spirits of the earnest fruit grower who finds so many disappointments and failures in rearing a profitable orchard of apples, peaches, or pears, and inspire one with new zeal in carrying on the great and good work of horticulture in our land? J. H. MARION,

Fulton, Mo.

DISCUSSION ON PERSIMMON.

Sam. Miller:—I will give some of my experience with persimmons. I first saw them when ten years old, and have been growing them in this state for years. I have four good varieties that ripen from September to March. They dry on the trees and keep all winter. My St. Thomas came from Cole county; Early Golden came from Kansas. The St. Thomas is long and of good quality. I succeeded in crown grafting large trees, but not with cleft grafting. I have the Chinese persimmon, but don't know whether it is hardy here. One thing in favor of persimmons, they will bear nine years out of ten, and if you let them get ripe they will be good. Even if gathered quite green they will ripen if exposed to sun and air. Possums, skunks and almost every animal will eat them.

Mr. Van Deman said the Chinese persimmon will be hardy in Missouri.

THE BEST NATIVE, EUROPEAN AND JAPANESE PLUMS.

It would take columns to give my experience in testing the many varieties of plums, the many names some are sold under, and the many sorts that prove worthless for me in Southwest Missouri. The Wild Goose is worth more than a hundred others, but the planter should not be mislead and plant only Wild Goose, as in some seasons it fails to self-fertilize. I believe the Newman is the best fertilizer for the Wild Goose as it is a good pollenizer and blooms early. Marianna is a poor bearer, also poor quality, but valuable as stock on which to work other varieties, as it will not sprout. It is the only one that will grow from cuttings. And also succeeds on soil where the peach or budded peach stock will not succeed. Abundance, for profit, stands next to Wild Goose. Miner is also one of the best. Many others could I name that fail some years, but as climate and soil differ so much I fear to mis-lead the planter by recommending too many varieties. Not less than three varieties of plums should be planted for a plum orchard.

A variety that may be a poor bearer when planted by itself and depending on its own pollen, will bear a full crop when intermingled with other sorts. If the weather during the blooming period is hot and windy a variety may waste its pollen before the stigmas are ready and in such cases the pollen of an adjoining sort must supply the want. I am lead to believe that peach and cherry pollen will fertilize the Wild Goose for I have noticed that it bears a full crop when in close proximity to them, but I never saw the apple have any effect. I feel convinced that plum trees are profitable in an apple orchard as insect catchers. The insects prefer the plum to the apple and plums stung will fall to the ground, only few insects reach maturity in the plum and birds will eat more than ten times the number of insects in plums that they do in apples. The curculio will remain in the plum about nine days after it falls, and will deposit its eggs in both cold and warm weather, but in cold wet weather they will seldom hatch. No fruit tree pays me as much for the amount of work required as plums. After the third year one acre of plums make more feed for fowls and hogs than five of corn. All fowls are benefited in the plum orchard, also the orchard receives benefit because of the fowls and pigs eating the insects and the stung fruit. If farmers knew the value of the plum they would not deny themselves and their families this beautiful fruit.

JACOB FAITH, Montevallo, Mo.

RESULTS OF THE DROUTH OF 1897.

In undertaking to talk or write on this subject, we are somewhat at a loss to know just where to begin or when to quit. It would be impossible for anyone, other than a scientist or an expert in figures, to do justice to the subject in one short paper, and we expect only to suggest a few thoughts, gathered from close observation during the past year or more, in order to provoke a discussion and get some of our scientists to talking, that we may learn something more than we know on the subject.

The drouth of 1897 was, in some respects, most remarkable, not for its long duration, but for its effects on plant life. We have often experienced a longer period without rainfall, but never, in the history of the country, was so much damage wrought to vegetation in one season. Many of you will, no doubt, be surprised, and I am sure some will question the correctness of the statement, when I say that the damage to our state alone does not fall short of $50,000,000. Some one says, "That does sound a little extravagant." Let us see. We must all admit that agriculture and horticulture are largely the sources of all wealth and prosperity. Missouri is a great state and is extensively engaged in these industries, and when we come to some up the shortage of all her crops, we find it soon runs into the millions. But the damage does not stop here; the effect on all other interests and industries can be computed only by millions. When the corn crop is short the grass is also short; the beef steer is short, the hog is short, the potato is small, the farmer's purse is flat, the manufacturer finds no sale for his products, the merchant can not sell his wares, the laborer is out of work, and the brakes are set on the wheels of commerce. Who is going to undertake to figure up this damage? Nor is this all. Go into the orchards, the berry fields, and to the forests, if you please, and there you will find thousands of trees and plants either dead or dying, as a result of the drouth of 1897.

The statement was made at the summer meeting of this Society that more trees were planted in the spring of 1898 than in any preceding year, and that more trees had died and would die, as a result of the drouth of 1897, than were planted in 1898; and now we are prepared to say that that statement was not only not extravagant, but was more than conservative, for, as predicted then, we have seen many trees die during the summer months, and only for the excess of rainfall during that time, many more might have died. This damage was varied in degree, according to various surrounding conditions. Besides all this there are other damaging results that are still more difficult to compute. The almost total failure of the apple crop of this year may reasonably be considered one of the results of the drouth of 1897. In proof of the latter assertion let us look into the conditions that were present before and at the time of this drouth. For months before it set in, there was barely enough rainfall to keep the surface soil moist, and that only where cultivation was kept up. All this time the moisture was being drawn from the subsoil, and in a short while after the last rain, the weather being warm, it was thoroughly dry and vegetation began to suffer at once. Whenever there is not a sufficiency of rainfall to force the moisture downward, capillary attraction is at work bringing it to the surface, and this had been going on for months, so that even the so-called tap rooted trees of the forests—the oak and hickory—were among the first to suffer. All these damaging results were governed and varied more or less by the surrounding conditions of soil, subsoil, location, exposure, state of cultivation, etc. Trees and plants on fairly good land, in a good state of cultivation, suffered least, while those on thin soil and not cultivated suffered most.

The question of cultivation against non-cultivation has been more clearly demonstrated than ever before, and the verdict is decidedly in favor of thorough cultivation. During this period of drouth the fruit trees were forming their fruit buds for the next year's crop, but having more than they could attend to, in the effort to mature a heavy crop of fruit, they were not able to develop their buds to that perfect condition which would insure a crop. This double effort so weakened the vitality of the trees that, although they were able (as a last effort of nature to reproduce) to send out a profusion of weakly, imperfect, unfertile bloom, the result was, no apple crop this year.

I am aware that most orchardists have attributed the failure to various other causes, but after a careful study of the question, I do not hesitate to make the assertion that the principal cause of the failure was the drouth of 1897. Let us notice once more the condition of a large majority of our apple orchards the past season, 1898, and see if we can make out what was the cause. All who have an orchard have realized the fact that the foliage was in a weak, sickly, haggard, imperfect condition from the full development of the leaf to the end of the season. I would not undertake to say that the drouth was the cause, nor would I make the assertion that it was not. I would perfer to leave this for some of our scientists, who, no doubt, have been thinking on the subject, and are prepared to tell us all about it. I am of the opinion, however, that the weight of evidence would lead us to the conclusion that this, also, is a result of said drouth as, wherever the drouth was most severe, there the foliage was most affected, other conditions being equal. There are, however, some other evidences that would lead us to conclude that it was a climatic condition, and in that case might it not have been both? It is possible that the vitality of the tree was so weakened by the drouth that the climatic condition would affect it when it would not show on a healthy tree. Another question that is likely to remain a question until nature herself has decided it next year is, can the orchards that were so badly affected during the entire growing season produce a crop of fruit next year? With the most favorable conditions all the time it is barely possible, but the chances are very much against it.

What has been said relates to our own state only, but will apply as well to the entire Mississippi Valley, or I might say, to the apple belt proper of the United States. Now, if the damage to Missouri alone was $50,000,000, and that is under rather than over, what shall be said of the damage in the aggregate, over this vast region where this drouth prevailed? It does not require much figuring to bring the damage of this drouth far in excess of the recent war debt. Is it any wonder that in spite of the cry of prosperity, the farmers and fruit growers are still feeling somewhat depressed? J. C. EVANS, Harlem, Missouri.

MISTAKES OF THE TREE PLANTER.

Is there a fruit grower present who never made a mistake in planting a tree? If such a man is here who has reached perfection in this line of horticultural work let him show his colors and come to the front and tell how it is done. However, it is useless to wait for his coming, for every man here has made mistakes, whether they are willing to acknowledge them or not is another question. From Adam, "*The Keeper of the Garden*," down to the present time poor human judgment has continually erred, and will continue to do so to the end of time. Now it is by experience we learn many things, and by comparison and exchange of ideas on different ways and means that we arrive at just conclusions, and that is what I understand this Society is for, to help its members and the public at large, to try and get on the royal road that leads to fortune in horticultural pursuits. It seems to the writer that the average Missouri farmer who usually conducts his other farm work with good judgment, and is fairly successful in his undertakings till it comes to planting and caring for his orchard, then he forgets his cunning and does up the job with less sense than anything else done on the farm. Now we will mention only in a general way the many mistakes made by the tree planters in choosing wrong varieties or a bad location or buying trees from irresponsible parties, or a number of other things which might properly come under the head of tree planting, but will confine our remarks to the common errors committed by the usual tree planter in the actual work of planting the tree.

First. It is a mistake to dig a hole so small that you have to crowd the roots all up together, and set the tree the same as you would a fence post.

Second. It is a mistake to dig a hole, either large or small, and throw out the top soil down to the subsoil and *leave it unbroken*, then set the tree with the roots on a surface nearly as solid as a board, and then expect the young tender roots to penetrate and grow and the tree to thrive.

Third. It is a mistake to set a tree very much deeper than it stood in the nursery row, except it be dwarf pear trees.

Fourth. It is a mistake to plant a tree and not prune off all broken and bruised ends of roots with a sharp knife, cut from the under side. The roots smoothly cut off will callous more quickly than if left as they come from the spade or digger.

Fifth. It is a mistake when pruning the roots not to examine and take out all borers, and cut off all roots affected by wooly aphis.

Sixth. It is a mistake not to spread out all the roots in a natural position, slightly inclining them downward.

Seventh. It is a mistake not to put the best soil around the roots.

Eighth. It is a mistake to put any manure around the roots. If soil is thin put fertilizer on top of the ground and let the rain wash the fertilizer down to roots.

Ninth. It is a mistake not to firm the soil down solid so as to exclude all the air from the roots as well as to pulverize all clods.

Tenth. It is a mistake after shortening the roots, which can not be prevented in transplanting and thereby lessening the trees capacity for absorbing moisture from the soil, not to cut back the top to correspond with the roots to make less leaf surface which exhausts the tree by evaporation.

Eleventh. It is a mistake to plant a tree in sod, and then replace the sod close around the tree to keep from disfiguring the lawn as we often see done in town lots. Turn the sod over and let it rot. Allow no grass closer than three feet of a tree planted on a lawn.

Twelvth. It is a mistake to plant a tree in the mud or put much water around the roots. Have the soil dry enough if possible to crumble or else it will bake.

Thirteenth. It is a mistake to lean a tree in any direction. Plant as near perpendicular as possible. All trees that are growing at an angle will be found with the new growth nearly all on the top side—nature trying to straighten the defects. Proof of this, go into the forest and observe the leaning trees.

Fourteenth. It is a mistake to plant a tree with the idea that you are going to die before it bears fruit, and that you will not get any benefit personally. *What if you do die,* can you erect a better monument to the labor of your hands? One of my salesmen told me once that he fully believes one half the people whom he approached on the subject of buying trees, never thought of dying until they are asked to buy a tree, then they invariably replied: "Oh, no, I am too old, I will die before they bear."

Fifteenth. It is a mistake to plant a tree and forget you are dealing and handling a thing of life, and while it is inanimate, yet it has a living organism that will respond to kind and generous treatment as quickly and surely as your live stock show the effects of good feed and grooming.

Whenever the writer plants a tree he fully expects it to grow, and is surprised only when it fails to do so. Many planters seem to be surprised when their trees live. Have faith in your work and use the same good sense and judgment in your tree planting as you do in your other lines of work and mistakes will be the exception not the rule, and success will crown your efforts. Thanking you, I close.

H. W. Jenkins, Boonville, Missouri.

Remark—Cutting off the roots of trees like Stringfellow, will not do in this climate.

GROWING CHERRIES FOR PROFIT.

Mr. President, Ladies and Gentlemen:—The Cherries are something the birds like very much, the children also eat them with great relish. About thirty years ago when I was but a boy, I remember the old cherry orchard of Morellos, sprouting all over the place and in every fence corner on my father's old farm. In those days we never thought of selling cherries, they were very plentiful, and the birds had great feasts among the branches of the trees eating cherries, also the neighbors received a great many of them. The cherry is propagated by budding on the Mahaleb or Mazzard stocks, the Mahaleb and Mazzard are mostly imported from Europe and planted in the nursery rows and budded in the following September, the buds take very readily with the Mahaleb when the work is done in September. We always use the Mahaleb on account of its late growth in the fall, and it never sprouts from the roots. There is no work in the nursery that I like better than growing the cherry. In these days we grow cherries for profit, as well as apples, pears and peaches. If you want to plant an orchard, select a nice rolling piece of land and plow it deep, about the last of September or the first of October; then select your trees from the nearest reliable nurseryman; buy nothing but good No. 1 trees, one or two years old, but one year is preferred. Buy those that are budded on the Mahaleb stock and you will not be bothered with sprouts. The varieties I would select would be: For early fruit, the

Early Richmond, for medium, the Late Duke, and late, the English Morello. After you have your land plowed and your trees on hand, lay off your land about sixteen feet each way, begin planting your trees in the early part of November, do your planting well and success will be sure to follow as far as the trees living. No water must be allowed to stand in the orchard, for the trees will do no good in wet soil, and in about three years you can begin picking the fruit. The cherry trees have many advantages over the apple and pear trees, the rabbits scarcely ever bother them, nor the borers either, and the fruit comes at a time of the year when there is but little other fruit on the market.

Another advantage of the cherry over the other small fruits, is you can let them hang on the trees for a week or more after they are ripe; this gives you plenty of time to find a market for them. You can always find a good market at Omaha or Des Moines, although in most cases you can find a market at some of your nearby towns, for a large quantity of them at a fair price.

The tree needs but little pruning; start the heads two and a half to three feet high; keep all broken and dead limbs cut out, and grow potatoes or melons for two or three years and then you can sow clover and plow it under to stimulate the ground. Pick your cherries with the stems on, and put them in quart boxes or baskets and you will be surprised the way they sell and the amount one thousand trees will bring you, I have seen the fruit from a single tree bring ten dollars. My neighbor has about eight or nine acres of young cherry orchard four years old, which brought him seventy-five dollars an acre last year.

Missouri stands at the head with big red apples, and she can also with her other fruits if we put the same care and expense and plant them out. We need more cherries planted; plant enough so we can ship them in car lots like they do peaches and apples. If we all plant peaches and apples, there is more danger in overdoing it. We ought to plant a variety of fruits, and in a year like this, with no apples to sell, we could have cherries, pears and peaches, possibly next year, cherries and apples to sell. You will find the cherry will fruit just as often and bring just as much money, and pay for itself before the apple begins to bear. I sell a good many orchards. When a man talks to me of planting an orchard, and he begins saying if it did not take so long for an apple orchard to bear, he would plant it. I tell him to plant his apples, and also ten acres of cherries to make money to grow the apple orchard. In planting orchards, if we would pay more attention to cherries, pears and peaches, when the apple crop fails, the fruit grower would have more money.

Now in regard to other varieties. There are a good many varieties like there are in the apple family, hardly worth planting. The Hearts and Biggereau varieties will do but little good to speak of, as they are usually short lived and do not bear but little, and are so good the birds get them all. The Dukes and Morellos are so sour the birds will not bother them if you will plant a few Russian Mulberries around the fence. I find that the English Morello bears like the Ben Davis apple. You can stand on the ground and pick most of the fruit and not be bothered with ladders, and the tree never dies in debt to you. We have one customer planting a two hundred acre orchard and he is planting about five thousand cherries and five thousand peaches and he is planting the peaches in between the apples and I think if more of our fruit growers would plant cherries, peaches and pears as well as the apple, they would have fruit to sell every year, and their bank account would hold up better from one apple crop to the next one.

J. P. Sinnock, Moberly, Mo.

Caution.—It is better to plant all stone fruits in the spring.

NOTES ON CHERRY CULTURE.

The cherry fills a gap in the fruit supply, that no other fruit can well take its place, in season or the culinary. The mild sub-acid flavor, toned with a peculiar agreeableness to the appetite, carrying with it a tonic like nature, that is so much desired to cool our burning thirst during the hot summer days.

Cherries are divided into two families or groups, the Heart and Biggareau, or the family of the sweet cherry; this includes all the white, yellow, and some of the red and black varieties, and are very rich and high flavored. The Duke and Morrello include the family of the more acid varieties. There are few more desirable fruit trees than the cherry. It may be planted as an ornamental tree, lining the streets or avenues, giving a touch to the beautiful in early spring, with their banks of snow-white bloom, and which soon changes to red, as the "fiery bush" of old, enticing the old and young to come and partake of the bountiful supply of luscious fruits.

The cherry can be grown successfully on any clay soil, with a well drained subsoil, and if mixed with gravel or shale is all the better. Planting for a family supply, the cherry may be planted in the yard or lawn, in which case the ground should be worked around the trees as much as three or four feet, the first two seasons after planting, to keep down the growth of grass and weeds; this method is much preferred to mulching. The mulching adds humus, which stimulates the growth of the tree, faster than it can ripen up its wood. Planting for a commercial purpose, the location should be selected, with two points in view, first that the entire plat intended for the orchard is well drained, and second, that the soil is not too rich with humus, with a north and east exposure, and should have a west and north protection. In the absence of the natural protection, this may be made by planting evergreens or some spreading native forest trees. Plow the ground deep, and harrow or level. Mark off the ground accurately, so as to place the trees twenty feet apart each way. If the surface of the land be level, plow the ground with a back land, for each row of trees. Dig the holes wide, and deep enough to receive the roots without twisting or bending; have the trees trenched handy to where they are to be planted, taking out a few trees at a time giving *protection* to the *roots* when taking out, and before placing the tree in the hole, cut back the mutilated roots with a sharp knife, to sound live wood. In placing in position in the hole, incline the stalk ten to fifteen degrees, to the southwest. Set the tree deep enough to bring the budded junction two to three inches under the level of the ground. Fill in with well pulverized soil by sprinkling on and through the roots. If the dirt is pitched in, a shovel full at a time, it will clog on top of the roots, leaving space underneath without any dirt. Pack or settle the dirt while filling in until the roots are well covered, when the firming should be done with the ball and heel of the foot, giving weight and force in this operation, until satisfied that there are no air spaces left. Conclude the filling on top, with loose dirt, and leave without tramping; this will prevent the soil from baking and cracking.

After the planting is all finished, then go over the entire plant, cutting off all broken limbs, but no other cutting should be done. If it is possible, after planting, and before a rain, the cultivator should be run through the orchard, loosening up the ground that has been necessarily tramped and packed, in planting. If the ground is fertile, the orchard may be planted to corn, potatoes or some hoed or cultivated crop for first two seasons after planting, and if the soil is rather over-fertile, crops should be grown up to the fourth season, when the orchard can be sown to clover, or left to grow up in weeds. In either case, the clover or weeds should be mowed the middle or last of June, and again, the middle or last of August, and in both cases, left on the ground. No pruning is required with the cherry, except to cut out dead or broken limbs, and the best time to do this, is when you find the limb dead or broken.

It takes one hundred and ten trees to the acre, if planted twen ty feet each way. The average yield of a cherry tree, at five years old is thirty-six quarts, selling at twenty-five cents per gallon, this would bring the snug sum, in round numbers of two hundred, forty-seven dollars and fifty cents, per acre. And if planted on proper ground, and with proper care, a cherry orchard can be depended upon for annual crops, ten and fifteen years. The cherry, as other fruit trees, are liable to disease, and injurious insects. In this case the orchardist must prepare himself with the proper knowledge, appliances and remedies, that he may know the diseases, and what and when to apply the remedy. And what insects are injurious, and how and when to prepare himself for war against them, and save his trees and fruits, for his use and profit. There is no such thing as immunity against disease or insects in the plant or tree creation. In this latitude and climate, we do not expect a spontaneous production. We have learned by observing the fixed laws of nature, that a violation of the law, surely brings a penalty. And by observing and complying with these laws, we are rewarded by health, prosperity and productiveness. The horticultural relations in this world, are indispensable to the human wants. The study of horticulture develops the science of Botany, and points out the lines of Zoology, and leads the student into Geology, and all in all, it will bring the student to the vital points of what each person should know, viz: "What is life," and from whence does it come? Horticulture starts at the protoplasm, covering the science of Chemistry, from whence first comes the plant food, afterward the food-supplying, and sustaining power of the animal existence. It teaches the fixed law of order, and life. It opens to view to the student, the science of evolution, and the relation between the mineral, vegetable and animal kingdom. In short, the more we know of horticulture, the better we are prepared to reason with nature, and Nature's God; and the more we can expect success with fruit, and better will be our profits. S. H. LINTON, Marceline, Missouri.

SOME INSECTS OF THE FLOWER GARDEN.

Floriculture for commercial purposes—an industry which has within comparatively few years attained to great importance—is largely carried on under glass and the plants, though not by any means exempt from insect attack, have but few foes, most of which are easily controlled. In the flower garden however, without which no country home, be it in suburb or on farm, is complete, the amateurflorist has to wage continual warfare in behalf of his treasures—*his* in the great majority of cases should be *her*. The disappointments experienced in these small tracts of ground would afford a pathetic theme for the rural poet. But nature is never wholly ungracious and to compensate for failure in one direction makes amends by unexpected success in another, so there is rarely reason for complete discouragement, and in regard to the garden almost more than in any other enterprise.

"Hope springs eternal in the human breast," and in the happy uncertainty of the future there are always more rainbows of promise than clouds of disaster. Especially is this the case in climates in which the seasons are distinct. The snows of winter seem to obliterate the dispairing resolve "never to attempt to grow this or that again." Then come the catalogues with their exquisite pictures and enticing descriptions and the flower lover succumbs and hopefully plants and transplants and cultivates and tries to be prepared for the insidious attacks of blights and mildews and the more open aggressions of bugs and beetles and caterpillers innumerable. *Destroying* these is not the difficult part of the task. There are poisons and traps "galore" for the extermination of all these pests; but, in the flower garden the main consideration must be to devise or select those which will check the diseases or insect ravages without impairing the beauty of foliage or blossom. It is true that if we could be assured that by the sacrifice of floral beauty for a single season we could deal such a death blow to our insect or mycologic enemies as to secure immunity from attack for the future, or even for a few years, it would be worth while resorting to heroic measures. But this is past hoping for. Germs and insects are practically infinite in number, variety and vitality. We may keep them in bounds, but, with few exceptions, extermination is impossible. Nothing remains, therefore, but to keep in mind not only the probability of the encroachments of familar pests, but to be on the alert for the appearance of new ones which are threatening invasion from all points of the compass.

As the apple, recognized the world over as the "King of fruits," has many more insect enemies than any other orchard tree; so its cousin, the "Queen of flowers" has a far longer list of sappers and minors and open ravagers than any other of our garden favorites. Without the gardener's ingenuity and aid it would soon succumb to these multiform and unintermitted persecutions, but with loving attention, how royally it repays us in perfection of form, color, and fragrance for all labor and expense!

In this section of the country, and indeed in almost all localities, the larvae known as "Rose Slugs" are the preeminent pests of this choice shrub. These so-called "slugs" are the young of certain saw flies, one of the few groups of the *Hymenoptera* that are injurious to vegetation. They are also called "false caterpillars" from their resemblance to the larvae of butterflies and moths. They either have no legs at all or have more than any real caterpillar, the number varying from eighteen to twenty-two. Many of them have a slimy surface or one upon which a white flaky substance is secreted.

Of these slugs there are three well-known species that seem to be peculiar to the rose. One of these is native in America and was first observed in the eastern states, but probably occurs on wild roses everywhere. The two others are of European origin and have been accidentally introduced by improters of French and English roses. Within comparatively few years they have been disseminated throughout the length and breadth of the land and have become exceedingly destructive to roses in the vicinity of St. Louis.

The American Rose Slug (*Monostegia rosae*) is single brooded, but as the egg-laying period is of several weeks duration the larvae are to be found on the bushes from April until quite late in June and it was supposed by Dr. Harris, who first described the insect, that it had at least two broods. I had the pleasure of disproving that statement by repeated rearing of the insect under close observation. The small, black flies, somewhat resembling the house fly though less in size may be seen resting upon or flitting about the tender rose leaves almost as soon as the latter unfold. They are very sluggish on cool mornings and may be killed by hundreds at such times by a slight pinch with the thumb and finger. The females with their delicate saw-like ovipositors open the tips of the serrations of the leaves and place their eggs between the two cuticles—a process which your chronicler was the first to observe and describe. The eggs hatch in a week or so and the tiny slug begins to gnaw the surface of the leaf. Its habit of feeding only at night and only on the upper surface of the leaf—after the first day or two—enables us to master it far more easily than we can its European allies. After feeding on the green tissue of the leaves from the upper sides all night the slugs, as the sun rises, crawl out of sight on the under sides of the leaves, avoiding those that they have skeletonized, and there rest motionless during the day.

They are between two and three weeks in attaining their growth and are then rather more than one third of an inch long with the thorax or front end swollen and puffed out on the sides. They are of a dull yellowish green with a smooth surface. When done feeding they drop to the ground into which they burrow to the depth of an inch or so and form around themselves a fragile earthen cell cemented by a viscid secretion.

They do not change to pupae until the following spring and always perish if their protective covering is broken. Hence the frequent cultivation of rose beds during late summer by throwing out and breaking the cells of this insect is an important measure in its destruction.

The bristly or Spiny Rose Slug (*Cladius pecticornis*), the more important of the two European species, I first observed in Prof. Riley's garden in Washington in 1886, and in 1889, to my dismay I found it in several gardens in the vicinity of St. Louis. With us it has been increasing in numbers and has become a most serious pest. There are at least four successive broods and consequently there is no relief from it, as in the case of the American species, after the early summer. The fly is much like that of the last named species except that it has pectinate or comb toothed antennae. The eggs are inserted in the upper side of the petiole of the leaf, several being placed in a row. The larvae are about the size of the first named species but are of a bluish green color with scattering forked spines or bristles. It feeds indifferently on the upper and under sides of the leaves gnawing them full of ragged holes. When matured it incloses itself in a tough, parchment like, bright brown cocoon generally attached to the underside of the leaf, and, transforming immediately, gives forth the fly in about ten days, except in the case of the latest autumn brood which hibernates in the cocoon.

The Coiled Rose Slug (*Emphytus cinctus*) is somewhat larger than the other two with a smooth, velvety surface, dark green above and gray or dingy white on sides and beneath. The large round brown head has a conspicuous blackish spot on each side. Its name is derived from its habit of resting on the under side of the leaf in a snail like coil. It eats the leaves from the edges, devouring them entirely. When full grown it bores into any dry stems or into the pith of weeds that may be convenient to under go its transformations. It is double brooded in the middle and treble brooded in the southern states.

Any arsenical spray or powder will kill these insects, but while the roses are in bloom such applications are very objectionable as disfiguring the plants with dust or sediment and rendering it more or less unsafe to to enhale the fragrance of the flowers. Whale oil soap, though not poisonous, has too much odor of its own to be a pleasant remedy. Besides, when there is an obsolute specific in a tea made from powdered white hellebore, which can be obtained from any druggists at small expense, there is no need to experiment with virulent poisons or ill smelling emulsions, all of them more or less injurious to the health of the plant. The decoction of hellebore is made by steeping an ounce of the powder in a couple of quarts of hot water for an hour or two and then reducing the strength by the addition of a gallon or gallon and a half of cool water. This should be applied in the evening, with a fine sprinkler, or, more economically, by splashing it on with a whisk broom. Two applications at intervals of ten days will be sufficient to dispose of the American Slug; but for the European species it is necessary to repeat the process at intervals of two or three weeks throughout the summer.

Another extremely destructive rose pest in the eastern and northern states, but one from which we in Missouri are happily exempt, is the Rose Chafer (*Macrodactylus sub-spinosus*) a slender, long legged, light brown beetle, that, in its perfect state is extremely voracious of rose blossoms and as larvae feeds upon the roots. It is also a formidable pest of the grape vine in the same sections of the country. It is so hardy that it can not be killed with any arsenical spray or kerosene emulsion that would be safe to use on the plants. Carbolic acid one part to one hundred parts of water is said to be the most effective application.

The Rose Aphis not infrequently gives considerable trouble during the early summer, but can be killed by a decoction of pyretheum powder or tobacco without marring either buds or tender leaves.

Bud worms, the larvae of five or six different Tortricids, are very apt to devour a large percentage of the early leaf as well as the flower buds in the spring and these can not be warded off by any chemical application. Some of the moths of these species are attracted to light and bonfires in the vicinity of the rose garden will destroy a considerable number.

Very choice bushes can be in a measure protected by throwing over them at night a square of mosquito netting or some simliar cheap thin material.

Besides these Micro bud-worms the larvae of several Owlet moths have acquired the epicurean habit of feeding in the buds and blossoms of our choicest hybrids and tea roses as well as in some of the more delicate varieties of June roses.

One of these, a large, cylindrical cut worm, one and one forth inches in length when full grown, is of a rich, velvety maroon color, and confines its diet of roses, to the white varieties almost exclusively. If ever "the worm in the bud" could lay claim to being an aesthetic object it is certainly this handsome species as it lies coiled in the heart of a creamy white rose. The insect is beautiful as a moth also, and very difficult to rear indoors. It is known as *Scopelosoma sidus.*

A still more pernicious species is *Pyrrhia umbra* a handsome red and yellow moth which lays its eggs at night on rose buds, forcing them between the sepals so that the worms upon hatching begin at once to eat their way toward the center of the bud and prevent its unfolding. We have found them especially destructive to the unique buds of the Crested

Province or Crested Moss, one of the choicest of the annual blooming varieties. Often eight or ten of the young larvae, which are of a greenish white color thickly dotted with shining black spots, have been taken from the mossy covering of a single bud. It is impossible to reach them with insecticides without injury to the blossoms, and, tiresome as the task may be, we have found it the best plan to carefully examine the buds every two or three days and remove with a pin the young larvae found upon them.

The later roses are much preyed upon by certain leaf beetles such as *Diabratica 12-punctata*, *Colaspis pretexta* and *Colaspis trislis*. The two latter are very insidious in their attacks, working only at night and hiding during the day.

During midsummer the new shoots of the Hybrids, Bourbons and Teas are often observed drooping and wilted and if examined will be found to contain certain boring larvae, either of a small moth or sawfly. An application of Pyrethrum or Hellebore powder to healthy shoots as soon as the work of these insects is perceived will prevent the damage from extending.

But as was remarked at the outset, the insects that attack the rose are so numerous that it would occupy much more than the time allotted me to give even brief mention to each.

In the spring the bed of Sweet Alyssum and Candytuft are apt to suffer severely from the attack of the Striped Flea beetle (*Nattica vittala*). These beetles do not breed upon the plants, but in their prefect state, congregate upon them and devour the flowers and buds. The most efficacious remedy is thorough dusting with Pyrethrum powder or watering with a decoction of the same. As this insect breeds mainly in the leaves of the wild pepper grass (*Lepideum* and *Arabis*), the destruction of this unsightly weed will serve to keep the insect in check.

The most serious enemy of Mignonette is the caterpillar of the European Cabbage butterfly (*Pieris rapae*). For this also liberal dusting with Pyrethrum powder is the best and safest remedy. It is effective also against a certain species of Aphis which likewise injure the same plant.

The Honeysuckle has quite a variety of insect enemies, the most important of which are a climbing cut worm (*Homohadena cadistriga*) and a species of *Aphis*.

As is the habit of most cut worms, the former works only at night, cutting off both leaf and flower buds, often entirely preventing the first blossoming and greatly injuring the vigor of the vine. As this larvae descends to the ground in the morning in search of a hiding place for the day, the best method of fighting it is to place bits of bark or chips or folded pieces of old carpet or sacking under the vines. It will avail itself of these for concealment and here it can be found, often in great numbers, and can be killed or fed to poultry. The Aphis attacks are not so easily repelled, and two years ago, when this insect especially abounded, many choice varieties of honeysuckle were ruined by it. Tobacco extract or very strong decoctions of leaves or stems were used by many florists, but the vines did not recover sufficiently to give any satisfactory bloom throughout the season.

The Hollyhock is often disastrously preyed upon by the larvae of what is popularly termed the Thistle butterfly (*Pyrameis Carduii*). From the entomologists point of view this insect is beautiful in all its stages. The ground color of the caterpillar is blush or lilac set off by longitudinal stripes of black, white and bright yellow, with seven rows of branched brownish red tubercles. The butterfly expands about three inches. The upper wing surface is velvety, of a rich reddish brown, shading to black toward the tips, where they are crossed by a white band. The undersides are much variegated in pale colors and white lines, with five eye like spots on the lower pair. When this insect is so numerous as to become a pest it may be poisoned by any of the ordinary insect powders, or, if the plants are not very numerous, removed by hand picking.

The Snap dragon (*Antirrhinum*)—mostly grown as an annual, but, with slight protection in winter, reaching much greater perfection as a perennial—has but few insect enemies but is, in some seasons attacked by a small but handsome bug (*Cosmopepla Carnifex*) whose multiplied punctures rob it of its beauty and cause the flower buds to drop or to develop into distorted blossoms. The most effective application that I have experimented with for killing the young bugs and dispersing the more mature ones, is a preparation of tobacco and creosote sold under the name of "X. O. Dust."

The Geranium, the most popular and dependable of all bedding plants, has very few insect enemies. Occasionally, however, the blossoms are ravaged by certain "red worms", the larvae of a handsome green and white moth (*Chloridea rexia*). These caterpillars are very imitative in their coloring and when feeding on red geraniums are so nearly the shade of the latter that they are likely to be overlooked until the ragged condition of the trusses betrays them. Naturally this insect breeds upon the grown cherry, in the flowers and fruit, in which case the worms are of various shades of green. When observed it is not a very great task to remove them by hand.

The delicately tinted blossoms of the white and pink geraniums and of the lavender are the favorite upholstery of the Leaf-cutter bee (*Megachile*) and trusses of flowers are often seen in which every blossom shows the circular scissoring of the sharp little jaws of this insect—for whose depredation no remedy has yet been discovered.

The lovely Cosmos—the latest of our out of door annuals, which often braves without injury quite severe frosts—has two stem-borers to contend with which not infrequently destroy a considerable percentage of the plants. One of these is that very omnivorous caterpillar not very definitely distinguished as the Stalk borer (*Gortyna nitela*).

Another is the grub of a certain beetle which I think is the same as one which bores the stems of the wild Ambrosia and Bur Marigold. There is no remedy for these borers except to cut them out where their presence is revealed. In the case of the Cosmos if the injured stem be laid flat upon the ground it will send out rootlets and perfect its flowers in a low head instead of one from five to seven high. The careful raking up and burning of infested flower stalks and of the weeds named in the autumn will do much to keep the last named borer in check.

The Chrysanthemum is usually grown for part of the year in the garden and in this situation has its share of enemies among the beetles and moths. But none of these is so troublesome as a species of brown Aphis which often causes great disappointment in the development of this regal flower.

This species of Aphis is not amenable to the narcotizing and paralyzing effects of Pyrethrum powder for the reason that the Pyrethrum is a close relative of the Chrysanthemum and the insects are unaffected by the qualities in the powder which are poisonous to other species. Kerosene emulsion and strong decoctions of tobacco are apt to injure the flower buds. A dense fumigation with tobacco smoke or a liberal dusting with X. O. Dust before the blossoms open will cause the aphides to drop stupefied to the ground where they are easily scalded or crushed.

The insects named in the preceding pages, while including the more prominent pest of the flower garden, are but a few of those which are found, annually, subsisting on leaf and bud and blossom and fruit, but though in the aggregate the damage done is by no means slight it is not, in the case of any one species, of sufficient importance to attract general recognition.

But we must remember that our flower borders have many insect visitors that are not of a reprehensible character. Those which do no damage and take no toll except an occasional sip of nectar from the many glowing cups so invitingly presented to them. Some of these insects, such as the butterflies add not a little to the attractions of the garden and some are indispensible to the perpetuation of plant species by seed and often bring about by cross fertilization the development of valuable and unexpected variations. So while we have the best of reasons for objecting to some of their relations, we still have a welcome for the bees and butterflies, the noiselessly flitting moths, the gaily band of flies and wasps, the ground beetles in their burnished coats of mail—many of which do us service by devouring the species that annoy us—whose absence we would miss more than we can realize and whose beauty and grace of motion fitly supplement the floral lovliness that attracts them.

MARY E. MURTFELDT, Kirkwood, Mo.

A TALK ON INSECTS.

During the past year I have received many letters in regard to the Shot hole or Pin hole beetle. The insect is about one tenth of an inch in width and three times as long as wide. It was supposed to attack only weak trees, but within the last year, I have been perfectly convinced that it will kill live and healthy trees; but trees weak in any way are most liable to its attacks. It begins its work in March upon plum, peach, apple and other fruit trees, and sometimes upon elm and ash. It alights upon the trunk and branches and bores its way through the outer bark into the cambium layer, where it lays it's eggs and feeds. The larvae eat laterally, remain for twenty or thirty days in this state, and then pass through their changes to the beetle state. This limb appears as if somebody had shot it full of holes with fine shot. They have three broods in a year. The adult does not appear till March. It passes the winter in the larva state. This beetle will sometimes gnaw the bark and the tree will bleed, so that in many cases the tree will ward it off. The beetle is drowned. The tree may bleed till it becomes weak, and then they may ruin it. In spring we notice damage upon the twigs; ordinarily upon the lower limbs, or the body of the young tree. They attack the tree around scars and other places where it will not bleed. It is a very difficult insect to fight; much more so than other borers. We can not apply wrappers around every limb of the tree. I have come to the conclusion there are only two things we can successfully use. Clean culture is of primary importance. Without this we cannot do anything with it. We must burn all the dead or dying limbs and twigs in the fall: and burn all trees, or parts of trees. that we can not save. Do it early, for they come out in March. Bore washes may help some. A lime wash early in March will afford protection to a large extent. Follow these directions and I think we can control this insect in our orchards. It is increasing and becoming more troublesome.

J. M. STEDMAN, State Etomologist,
Columbia, Missouri.

President Murray called upon the guests of the society for a few words.

Mr. Wragg of Iowa;—I thank this society for the courtesy and hospitality it has given to the representatives from the sister states. We are beginning to look upon Missouri as one of the foremost horticultural States. We have got to come to Missouri for our winter varieties of apples. We find we can not get them from Russia, Minnesota or Wisconsin. This we have discovered by long experience, and have lost much time in demonstrating this fact.

The impetus from this society is felt far and wide beyond your State borders. We are glad to know there is such harmony among fruit growers, while the nurserymen take back seats. I hope you will send one or more delegates to our Iowa meeting. I thank the professors in the University for their courtesy and interest. We want your sympathy and help.

Professor Stedman (in reply to a question):—Concentrated lye will not weaken the poisonous quality of Paris green.

Professor Irish: — Will the woodpecker take the pin hole beetle from trees? They will peck holes and put acorns in trees. We find them in the trees and they are grown over, sometimes.

Professor Stedman:—I don't know whether the woodpecker does it or not.

Mr. Chandler: — I have seen woodpeckers putting acorns in trees.

TREES THAT HAVE BEEN NEGLECTED.

Although no subject has been assigned to me on the program, as second vice-president I take the liberty of selecting my own subject.

We all well know that all the fruits that flourish in these parts have been greatly multiplied and improved for years, but the nut family has received very little attention. I will begin with the Chestnut because it has been my delight to gather them from my earliest recollection. Trees five feet in diameter at the base, seventy feet high with a spread of fifty feet stood on my father's farm in Lancaster county, Pennsylvania. Now since from experience I know that this valuable nut can be raised here, the interest in its cultivation is one of my hobbies. A Paragon tree grafted about six years ago has fruited these past two seasons, and is a treasure. A tree of the common American Sweet, also bore for the first time and is of fair size.

One bushel of these was brought from the East and they are now in the ground for next spring's planting. A peck of Paragons are also on hand for the same purpose. There are thousands of acres of rocky hill land around here that cannot be cultivated, that is just the kind of soil in which the Chestnut will flourish. If these on hand here prove a success in growing, the tree may be a pleasure and a profit to those who come after me.

Next comes the Pecan, a commercial product here in the West. In clearing the bottom lands along the Missouri river many farmers had the wisdom to leave the pecan trees standing and have sometimes realized as much from the nuts, and sometimes more than the wheat crop of the same ground, which seems to lose but little in yield on account of the trees. A few weeks ago I paid three dollars for a part of the crop off one tree, which stands in a clover field and the grass seems to be as good up to the very base of the tree as elsewhere. It is the Meyers Pecan. Another is called the Polman, it is not quite so thick but longer and has a thinner shell; both are of excellent quality. Both the Chestnut and Pecan are beautiful trees, fit for any lawn; and the timber of both is valuable.

The Chinquapin, the smallest of the Chestnut family, is also worth growing on account of its sweet meat. It grows as a dwarf, while others of its kind grow to be large trees.

The Hickory and the Walnut should not be overlooked, for they are also valuable for their fruit and timber. In clearing land they should be left. They are long lived trees and when a man plants them he plants for three or four generations of men.

Now for the Persimmon, which cuts no small figure this season when apples are so scarce. On my place just now, December 3, there are at least twenty bushels and not an inferior one in the lot. When I find a man who says he does not like them, then my conclusion is, that he never ate a good ripe one. If not ripe it is about as unfit to eat as anything possible, and if tried in this condition the man will find his mouth twisted and curled and will think it is turned into a cheese factory; but when fully ripe there are few fruits more delicious. My collection consists of six grafted varieties. some ripen early in September, while others hang on the trees until past mid-winter. The aim is to get as large fruit as possible, of good quality, and with as few seeds as possible. A strictly seedless one is often spoken of, but none has yet reached me. The seedlings here usually begin to bear in about six years, and when they once commence, may be called the fruit that never fails. The seeds if put into the ground in the fall grow the next spring as freely as corn.

I have sent seeds all over the country, for years past, and seedling trees also. They should be set out at one years growth, for when older the roots are so large that they are difficult to handle, and not so sure to grow.

The suckering propensity is usually caused by breaking or bruising the roots with the plow. It blossoms after all danger of late spring frost.

SAM'L. MILLER, Bluffton, Mo.

HOW TO PRESERVE FRUIT TREES FROM INJURY BY APHIS, BORERS AND RABBITS.

Mr. President and Gentlemen of the Missouri Horticultural Society: —That aphis, borers and rabbits are a serious menace to the successful growing of fruit trees in many localities both in Missouri and Arkansas will be generally conceded. The advantage that would accrue to orchards by securing immunity from serious damages that are liable to be inflicted by these pests, and the fact that the "*Southwest*," an excellent horticultural paper of extensive circulation, has published and endorsed a remedy for aphis accredited to me, prompts me to offer some suggestions for your consideration. With regard to the aphis I have been reading, investigating and experimenting for the last six years. On page 341 of the thirty-seventh annual report of the Missouri Horticultural Society, will be found a notice referring to my efforts in this direction. The last four years I have been waiting and watching the results of experiments begun years ago and modified from time to time as experience has suggested. The results attained by my efforts have been gratifying, far exceeding my expectations. Primarily I sought only a remedy to prevent the aphis killing my trees. Close observation confirms the belief that the application used for aphis has prevented all injury from borers. It may be well to remark in support of this claim, that in pruning a lot of trees as they were being set out I found that they were infested with the limb borers when brought from the nursery, and that they were much deformed the first year by defoliation, caused by the young borer feeding at the base of the leaf. In treating these trees with others for aphis, I washed the whole top with the mixture, and have been agreeably surprised at not being able to find a borer or a sign of one in my orchard for the last four or five years.

A greater surprise awaited me in finding that I had also secured perfect immunity from the gnawing of the trees by rabbits. As I do not desire to unnecessarily extend this paper by giving my experience in detail, and whereas, some members of this society may think and might say, he is claiming too much merit for the preparation, I wish to state that whatever benefit may accrue to those trying my method it will cost them, to profit by my experience—exactly nothing.

After trying several remedies, single and in combination with others, I conceived the idea that a combination of several of the best known insecticides, using soap as a base, would retain its strength longer than any one alone and thus be more effective. After repeated trials this formula was adopted:

One gallon soap, 1 quart lime, 1 pound of salt, 1 pound of sulphur, 1 pint kerosene oil and 1 of carbolic acid.

Use water and mix to creamy consistence.

No rule can be given that will be applicable to all the varied conditions which occur in using the mixture. The essential point to be kept in view will be to adapt the strength and quantity of the preparation used to the condition and size of the trees treated. If trees are found, by digging, to be infected by strong colonies of aphis, I would advise raking off more or less of the top soil and applying the mixture diluted with six parts water.

It may be beneficial to remark that firm, tenacious soils can not be penetrated by the aphis to any considerable depth, but that in loose, gravely and rocky soils they may be found more than one foot in depth. It is in the last locations that they get in their most deadly work.

Where the aphis are few, and when using the mixture for borers and rabbits, it may be diluted from ten to fifteen to one; by thoroughly applying it to the trunk and the large limbs, and also sprinkling the ground about the tree you will destroy or check the aphis and borers and keep the rabbits away. I can account for the ingredients used, killing the insects, but why it bluffs the rodent is a mystery unless it is the smell of the kerosene or the carbolic acid; perhaps the combination does the work.

In conclusion I wish to say that my experience demonstrates the usefulness of the compound in question, as I have lost in the last five years less than one tenth of one per cent of my trees from the agencies mentioned, and some of my neighbors have also been greatly benefited by the use of the mixture applied to their fruit trees.

I trust your society will give this matter the consideration it fairly deserves. GEO. BILL, Bentonville, Arkansas.

DISCUSSION.

Professor Stedman:—He may control it by means of some of his ingredients. Some of them are of no use; sulphur, for instance.

Secretary Goodman:—This man is quite successful.

Mr. Wilkerson:—What does this society think about nurserymen sending out trees with small quantities of aphis on them, say one or two small roots?

Professor Stedman:—I would say it is perfectly right. If the tree is only slightly affected there can be no objection to selling it, for you can kill the aphis by dipping the tree in kerosene emulsion. You need not try to quarantine against this insect for it is widely spread.

Mr. Wilkerson:—We made a rigid rule to throw away every tree that had aphis, no matter how little.

Professor Stedman:—I advise nurserymen to throw away badly infested trees. I have no particular interest in favoring either the nurserymen or the fruit growers, but we must not refuse fairly good trees. The infested roots might be cut off, but there would be a chance that the eggs would remain on other parts of the tree. I would not advise the use of concentrated lye to kill the aphis. It is dangerous. A handful of tobacco dust put around a tree when planted will kill the aphis.

President Murray:—Might trees be apparently free from aphis and yet have the eggs on them?

Professor Stedman:—Just so. I recommend dipping trees when you receive them.

C. M. Stark:—Would not aphis proof stocks, such as Northern Spy, be advisable?

Professor Stedman:—Such stocks are used in Australia, I don't know why they are not here.

Question:—Would trees planted two years be infested with aphis if they had been treated when planted?

Professor Stedman:—In some cases they might; sometimes nurserymen can not keep it away from their trees. The soil makes a difference.

Mr. Wilkerson:—We find it more often in loose soil than in the more compact.

Professor Taft:—It is not generally troublesome in Michigan. It is found in some places. With us the inspector is required to dip these trees before they are sent out. He has found two or three nurseries with peach and two or three with apple aphis. In the orchard tobacco dust has been effectual. In some sections wood ashes are used with good results. Remove the soil around the tree, and apply a half bushel of ashes.

Mr. Wilkerson:—Would it not be a good plan for the buyers to appoint an inspector to inspect the trees sold in the county. I think this would work well.

Mr. Chandler:—I would be afraid of ashes applied too heavily to the roots of the apple tree.

Secretary Goodman:—I put three bushels of ashes around four year old Genet trees without harm. In any reasonable quantity they will do nothing but good.

Mr. Baxter:—We put ashes around our grape vines for twenty-five years. They are thrifty and hardy. I put two ash shovelfuls around each vine. I have seen no bad result.

Mr. Murray:—I have had trees killed with a shovelful of ashes.

Mr. Davis:—I burn trash in the holes dug for the trees, and they do well.

Mr. Irvine:—Have coal ashes any manurial value?

Professor Whitten:—I think they have little value. In some cases they may lighten up the soil, and be of some benefit mechanically. Saw dust is no good. Soft coal ashes may do some harm when fresh on account of the sulphur. I advise you to be careful with soft coal ashes.

J. C. Evans:—We use all the ashes we can get on all manner of fruit trees and plants, and I have never seen any damaging results at all. We use them more freely upon our peach orchards. We often mix them with bone meal. We carried on experiments with fertilizers of which ashes were a part. You could see very plainly where they had been used just by driving over the orchard. There was a vast difference. We get the ashes from a limekiln on the road. We take them as they come; always perfectly dry. They cost us just a little bit besides the freight. When we get them we dampen them and let them stand for ten days before spreading. They become very strong, but we put them on the surface of the ground and work them in with a harrow.

J. H. Marion:—I put ashes around an Early Harvest apple tree. They killed the sprouts, but did not harm the tree.

J. C. Evans:—You can't kill a peach tree with fresh ashes.

C. M. Stark:—We use ashes broadcast in the nursery, all we can get.

Question:—What is the use of putting ashes upon the soil if, as Professor Schweitzer said, the potash stays on the surface?

Mr. Van Deman:—I have made a great many experiments, and I am quite confident that the potash will work down. If it does not go down the roots will come up and find it. Potash and phosphoric acid are not lost in the soil. Nitrogen is sometimes lost when there are not roots in the soil to use it.

J. C. Evans:—There was great complaint of the curl leaf on the peach the past season. Trees treated with wood ashes were not affected. Many orchards in the same locality were badly affected.

Professor Taft:—You are somewhat different from Michigan. In Michigan the more ashes the more curl. Mr. Morrill uses ashes freely, one hundred bushels per acre. His trees were badly affected. Spraying with lye may prevent curl leaf, but something else is better. Two pounds of blue vitrol to the barrel of water before the trees start is the best preventative. We have sprayed from November to April. Six weeks before the buds open seems to give the best result. One pound of whale oil soap to five gallons of water is effective. I don't think the ashes caused the curl leaf in Mr. Morrill's orchard, but they did not prevent it. I think it was caused by his severe pruning; the growth was immature.

Question:—Have ashes any effect upon the fruit?

Professor Taft:—Mr. Morrill relies upon wood ashes and ground bone. He uses no manure on his orchard. Potash increases the color and improves the flavor of the fruit. Potash helps retain the fruit upon the tree. It does not drop so easily when the trees are fertilized with potash. I suggest an experiment to improve the color of the fruit: spray with flour of sulphur, one pound to five gallons of water.

The following letters were read:

Smithville, Clay Co., Mo., November 28, 1898.

Mr. L. A. Goodman, Westport, Mo.

I would like to ask for information on the following subjects of the Missouri Horticultural Society, when in session at Columbia:

First: What will be the effects of the drought of 1897, on the apple trees hereafter?

This it is impossible to state. The damage is very serious in some places, and will continue to show for years.

Second: Does it pay to spray the apple trees? Yes.

I will say that my own observation is, that many apple trees, in the prime of life, were badly injured.

The question is, will they ever recuperate? Yes, if well cultivated.

In regard to spraying, I have sprayed for the last five years. I never have been able to tell whether it paid on the apple or not.

My experience in spraying Plums is this:

I have an orchard of Wild goose plums, about 150 trees. Some eighteen years ago while visiting near Clinton in Henry county, Mo., I found the finest wild plum I ever saw, growing to perfection. I brought some of the seeds home and planted. When they came into bearing they grew large but were so wormy, that they were worthless for use. Since I began to spray, they have been clear of worms.

If I could have the same evidence of benefit to apples from spraying, I could work with more heart. Have any of the members any experience?

Ans.—Results are usually much more positive with the apple than with the plum, but the general opinion is that spraying does pay.

C. Aul.

Shelby, Mo., December 30, 1898.

Secretary Goodman.

I bought one ounce of corrosive sublimate and prepared with eight gallons of water and soaked two bushels of seed potatoes to kill scab. Last April after using the same I had a Missouri Pippin apple tree six years old that has been attacked with twig blight and had to cut the limbs of the tree each year for three years and the tree was nothing but a stump with but few limbs, from effects of blight. Now I took the water after soaking the potatoes and sprayed the tree thoroughly with the mixture with the expectation of killing the tree, but to my surprise the tree took on a healthy appearance and the limbs made a growth of three to six feet through the summer, and not a leaf blighted on it through the whole season, and up to date the tree is one of the healthiest looking trees in my ten acre orchard. Would it not be well to try this treatment for pear blight? I shall if I have any the coming season. Should twig blight bother others I would like them to try the remedy. Very respectfully,

S. L. Wilson,
Shelby, Linn Co., Mo.

Certainly worthy of trial.

At the close of the session the members of the Missouri Press were welcomed to the hall as guests of the Society.

Pres. Murray:—Welcome to the members of the press. We recognize the great power of the press. We could never have done the work we have done without the press. We have before us a man of whom Missouri is proud, and the whole country is proud. He is the father of this Society. You gentlemen may have some claim upon him, but I think we have a greater claim, as horticulturist. He is the author of the Experiment Station idea. I have the honor or introducing to you Col. Colman.

Col. Colman:—I ask a few minutes of your time. We consider it a high honor to be visited by the press of Missouri. This, I believe, is the first time we have had the pleasure of receiving you in a body. Our relations have been pleasant. There is no class of men more cordial to the press than the members of this State Horticultural Society. I was honored more than forty years ago by being made its first president. I wish you could have been here to-day and heard the essays and the discussions in regard to this great subject. Missouri is the home of the big red apple. Look at our tables and you will see we have been standing up for Missouri. No other class of men have done more to advertise the state than the fruit growers. We want your aid and encouragement. We have had it, and we expect it in the future. You are the molders of public opinion. You have told the world of the medals we have won at the last Trans-Mississippi Exposition at Omaha. You showed that Missouri stood away above every other state in fruit growing. I feared we would be disappointed at Omaha, but the fruit grower came to the rescue. We have fruit growers starting all over Missouri. We have not developed our state. We have just commenced. Its superior climate, its superior soil are just becoming known. President Murray, Ex-President Evans, Secretary Goodman and many others have spent time and money to let the people know.

For every day in the year I wish you health, happiness and all good things.

Prof. C. H. Dutcher:—We are exceedingly anxious to have you know and realize that we extend to you a most hearty greeting and welcome. We are laborers together. You advocate fruit growing; we cultivate the soil. Are you not engaged in the business, helping to remove every enemy from society, as we fight the insects and diseases that prey upon our fruits? We are experimenting to get rid of the San Jose scale; you are trying the reformation of society with your pen. You all do it in the same way. It is not so with us but we are all working to the same end, the development of the resources of our great State. Build a wall around Missouri as high as Heaven, and we have every element to develop ourselves into a great nation.

If you knew how insects are increasing you would see that it is necessary for us to have more and more experiments. I call you to visit the Horticultural grounds and see what has been done without anything to do with. I know you will help us if you see the need of it. If something more is not done we will be overrun with insects and pests. We pray that we may have your help.

President Murray:—We invite you to come back to-night.

Sec. Goodman presented each member of the press association with a badge.

SIXTH SESSION.

Thursday, 8 P. M.

The hall was full to overflowing and Mr. M. B. Waite, of Washington, D. C., delivered a lecture illustrated with the lantern slides, on "Diseases of the Apple."

The music for the evening program was given by the young ladies of Stephen's College.

First a vocal solo—Miss Catron, beautifully sung.

SOIL FERTILITY AS RELATED TO LEGUMINOUS CROPS.

Any discussion which has to do with the fertility of the soil is fundamental. It lies at the very foundation of every other agricultural occupation. It matters not whether that occupation be breeding and feeding live stock, Horticulture, the growing of fruits and flowers, or the growing of grain crops. The success of any and all of these operations depends upon the fertility of the soil. The history of every agricultural country under the sun is a history of declining soil fertility, and no agricultural nation has lived long without having been confronted with the possibility of exhausted soils. In the West, we have scarcely yet reached that point where the problem of soil exhaustion is a serious one. It is an unfortunate fact that we do not begin to consider ways and means in maintaining soil fertility until our soils become exhausted. It is a far easier thing to maintain a fertile soil than to render a soil, that has been exhausted, again productive.

There are at least thirteen elements which are necessary for the health, growth and development of all plants. These are the most important of Nitrogen, Phosphorus, Potash, Lime, Magnesium, Iron, Sulphur, Carbon, Hydrogen, Oxygen, Sodium, Chlorine and Silicon. Of these thirteen elements only three need to be seriously considered in a discussion on soil fertility, for the reason that all the other elements are present in all ordinarily fertile soils in sufficient quantities, so that they are seldom exhausted from the soil. The three elements that may be removed from the soil by continued crop production are Nitrogen, Phosphoric acid and Potash. These are sometimes called the great agricultural "triad." Of these three elements Nitrogen is the most important. It is the most important because, unlike Phosphoric acid and Potash, it is not found in appreciable quantities in the original rock. Soil is decomposed rock; therefore the decomposition and disintegration of soils is continually supplying more Potash and more Phosphoric acid, whereas Nitrogen must be supplied from some external source. The atmosphere is composed very largely of this element Nitrogen, and it was formerly supposed that plants might obtain some of this Nitrogen from the air for their use, but later experiments seemed to disprove that supposition. The disagreement which arose over the ability of the plants to secure Nitrogen from the air came about largely by the use of different families of plants in their experiments, and it was finally definitely determined that one family of plants, viz; the leguminosae, (clover, cow peas, etc.,) were able by the aid of certain micro-organisms in the soil to fix the free Nitrogen in the air and make it available for the use of plants. Nitrogen seems to be intimately associated with the life processes of the plant. The activities, the assimilative functions and general nutritive processes seem to take place slowly in the absence of a sufficient quantity of Nitrogen.

The consideration of Nitrogen in relation to soil fertility is important also because of the properties of this element. Of all the elements of plant growth, Nitrogen is the most fickle, unstable and unreliable. It forms no stable compounds. It continually exhibits a tendency to leave its chemical combinations. For this reason it is eminently fitted for the life processes which require continued changes in the plant. But this peculiar tendency of Nitrogen makes it a very difficult element for the farmer to control. It is costly; at current prices for commercial fertilizers, Nitrogen is rated at fifteen cents a pound, whereas Potash and Phosphoric acid are each rated at only five cents per pound. The amount of Nitrogen in any given soil, and even in a fertile soil is limited. In some fertile soils it has been determined that there is sufficient Potash to produce crops of wheat exclusively for 360 years, enough Phosphoric acid to produce wheat for 140 years, but only enough Nitrogen to produce the same crops of wheat for about 100 years. For a great many reasons then we see that any method or practice which will increase the store of Nitrogen in the soil will greatly improve its fertility. It has been determined, as before mentioned, by careful experiment that all leguminous plants have the peculiar power of fixing the free nitrogen gas of the air which exists in such great abundance, and changing it to the form of Nitrates, in which form it can be readily used by all species of plants. This fixation is accomplished by means of a minute micro-organism in the soil which attaches itself to the roots of the plants, causing the development of a small tubercle or swelling and inside this tubercle or swelling the free nitrogen gas of the air is changed to Nitrates. So far as we know, the leguminosae are the only plants which are able to fix this Nitrogen in this way, in quantities large enough to be of practical importance to the cultivator of the soil. This then opens to us an easy way of maintaining soil fertility. In a soil of ordinary fertility, by a proper rotation of crops in which clover or cow peas or some other leguminous plant occurs, we are continually adding to the soil this valuable and costly element Nitrogen. Practical experience has taught us that the fertility of the soil, so far as Nitrogen is concerned, may be maintained by growing a sufficient number of crops of clover or cow peas.

How then is the supply of Phosphoric acid related to the growing of leguminous plants? We have found that Nitrogen may be supplied by growing these clover plants, and in the beginning it was stated that the only three materials which we need to consider in a discussion on soil fertility are Nitrogen, Phosphoric acid and Potash; then if we can show that Potash and Phosphoric acid may also be accumulated in the soil by the use of these crops, we have partially solved the problem of maintianing soil fertility. The roots of the leguminous plants, particularly clover, grow deep in the soil. The roots of our ordinary grain crops are surface feeders, and a soil may soon become exhausted so far as the plant food available for wheat is concerned, and may still be fertile for the growth of clover, for the reason that clover goes deeper in the soil and is able to feed upon plant food there that is out of the reach of many other crops. But when clover or cow peas are grown on the soil for fertilizing purposes, they also bring this Potash and Phosphoric acid from the deeper layers of the soil to the surface. Not only is soil fertility brought up from the deeper soil, but the roots of plants growing in contact with the soil are continually dissolving the elements of plant food, particularly Potash and Phosphoric acid, and any crop grown upon the soil for the purpose of green manuring is at the same time increasing the available plant food in in the soil by dissolving the unavailable compounds. These are some of the reasons why the growth of leguminous plants on the soil will increase the fertility of the land, and the growth of leguminous plants is always a cheaper process of fertilizing than by the application of commercial fertilizers. Wherever clover can be successfully grown it is unquestionably the best of all leguminous plants for fertilizing puposes, but we sometimes have soils that are too poor to grow clover successfully. On such soils we have sometimes found that cow peas may produce a large growth and succeed in fixing considerable quantities of Nitrogen. For this vicinity (Boone County, Mo.) the best variety for all purposes is probably the Clay cow pea. In South Missouri later maturing varieties may be employed. Cowpeas may be cut and cured for hay, or they may be pastured, or they may be plowed under for green manure. The greatest objection to cow peas for hay is the difficulty in curing them. The stems are large and juicy and the weather is generally unfavorable when they are ready to harvest. When harvested for hay, they should be cut just as the first pods are becoming brown. If they are to be harvested for hay, more seed should be used than when they are simply to be pastured or used for green manure; not less than one and one half bushels per acre should be used.

If the Missouri farmers and orchardists can come to a realizing sense of the great importance of conserving the present fertility of our soils and the relation which exists between the growing of leguminous crops and this conservation of fertility, there will be saved to the State millions of dollars which otherwise in a very few years will be necessarily expended for commercial fertilizers.

F. B. MUMFORD, Missouri Agricultural College.

THE BEE AND THE HORTICULTURIST.

The title of my paper opens out a subject far too large for a thorough discussion of it in the time and space at my command. As your secretary his suggested in the printed program that the papers be brief. I will confine myself to a few of what I consider the most interesting and important phases of the subject, and will endeavor to discuss these as concisely and and briefly as is consistent with their importance.

I write from the standpoint of a beekeeper, and as such I greatly appreciate the friendly and sympathetic feeling manifested for apiculture on the part of the horticulturist of Missouri, as is evidenced by there being made a place on your program for my paper.

There are many reasons why the two industries should work hand in hand, yet I am aware they do not always do so. In some localities there has been open warfare, and the difficulties have found their way into the courts. I may remark, in passing, that so far as I know, the decision has always been in favor of the bees. The Beekeepers' Union has never lost a suit. It is greatly to be deplored that there has been any such antagonistic feeling existing. No greater misfortune can come to a country than for its citizens to divide themselves up into cliques, or classes, each of which is trying to build itself up by tearing the others down. I trust that I shall be able to show before I close that there should be no lack of harmony between apiculture and horticulture for each needs the other in order to prove a perfect success. Beekeeping is a legitimate branch of agriculture, and so I consider horticulture. It is true, horticulture may be made a specialty, and as such, furnish a competency to anyone who gives it all his time and attention, but a great deal of it is carried on in connection with general agriculture. Beekeeping alone will not furnish a very good living to anyone at present in this locality. There are places where it may pay as a specialty, and, perhaps, this will be the case in some parts of our own great state when the farmers realize to the fullest extent the value of alfalfa, alsike clover, and sweet clover as forage plants and soil renovators. Beekeeping will, however, be found a valuable adjunct to many other pursuits, and may be carried on profitably in connection with them. Especially is this true of horticulture, on account of the peculiar relations of the bees to flowers and fruits.

Probably the first question a horticulturist would ask is, "Are bees ever an injury to plants or their fruits?" Some have claimed that they are. Let us examine carefully the pro and con of this question for a short time and see if we can get at the real facts. Many of the difficulties between the bees and the fruit growers have arisen from a lack of a perfect knowledge of all the facts in the case. Beekeepers have often claimed too much when discussing the subject, and the result is that fruit growers have been inclined to doubt all of their statements when some have proved to be untrue. It is sometimes asserted that bees injure the flowers by taking from them the nectar and pollen. How is this? The theory has been broached and pretty thoroughly proven, as I think, that females have a superabundance of anabolic, or constructive, material, which in the animal kingdom is thrown off by a physiological process when not needed to nourish a foetus or a living offspring. The purpose of this overplus is to perpetuate the species, so in the widely different yet deeply similar world of flowers, as suggested by Geddes and Thompson, there is a surplus of constructive material which has no other purpose in the life of the flower than the perpetuation of the species. The nectar is of no value to the flowers, only as it aids in the accomplishment of a certain end, namel , its fertilization. Until this is accomplished, the superabundant constructive force of the flower is given to its secretion, but once the flower is fertilized the secretion of nectar ceases, and the nectar-producing energy is applied to the development and nourishment of the germ, which is to produce the future plant. The pollen represents, as all of you no doubt know, the male element of the plant, and no more of this is of any value to the flower than is necessary to secure its fertilization. So, when the bee carries away the pollen on its legs and the nectar in its honey-sac, it is not robbing the plant, as some would have us believe, but is doing it a service while it is adding to the wealth of its own larder, the contents of which will finally administer to the gratification of the delicate palate of man. In fact, I think that it has been proven, beyond the possibility of contradiction, Mr. Meehan to the contrary notwithstanding, that the secretion of nectar and the beauty of flowers have a very close relation to the insects which visit them, so that Sir John Lubbock was not far out of the way when he said, in speaking of the bees, "To them we owe the beauty of our gardens and the sweetness of our fields.

When I say that bees never injure flowers, I do not want to be understood as saying that in no case do they multilate them, for, as I suggested before, beekeepers should not claim too much. Even so careful and painstaking a writer as Prof. Cook has said, "Bees never bore for nectar, but seek, or even know only of that which is fully exposed." However, he modifies his statement by saying that the late Prof. Riley felt sure that bees are sometimes thus guilty. There can be no question but what the position of our lamented Riley was correct, for it has been proven beyond a doubt that bees do sometimes perforate or pull open flowers. Yet it remains a question whether these openings are a real injury to the flower, except that they enable the insect to get the nectar without securing its pollination. Thus the plant fails to produce fruit, not because the bee visited it, but because it did not reach the nectar in the way which would have made it do for the flower what the flower could not do for itself. So I think we are safe in saying that bees seldom, if ever, injure the flower in any way; but how about the fruit? Here has been the fruitful field for contention, for many horticulturists have persisted in saying that bees do injure fruit, especially the grape. All sorts of charges have been made against the bees. They have been accused of eating up bodily whole vineyards, I mean the fruit, and some have gone so far as to claim that they have devoured apples, peaches, pears, plums, and I was about to add corn, but I guess this has not been included in the list of farm products which have disappeared before the terrible march of the honey bee with its voracious appetite. Now, what are the facts in the case? Do bees ever suck the juice of grapes? Yes; when they are cracked open, or have been punctured by other insects, such as wasps and hornets, they will suck every drop of juice out of the grape. When grapes have been left on the vines until they are over-ripe, for the purpose of making wine, and there are large quantities of bees in the immediate neighborhood, they will even sometimes become a menace to those who are engaged in gathering the fruit, but that the honey bee ever injured sound fruit or punctured a perfect grape yet remains to be proven. A few years ago the Government had a special agent employed in making investigations along this line, and after repeated tests and experiments, which I can not mention here for want of time, he said, "My observations and experience with bees in confinement and those having free access to vineyards furnish abundant proof to convince me that bees do not and can not under any circumstances injure sound fruit." This man had no axes to grind, and had no reason for promulgating anything but the plain and unadulterated truth. I have made repeated tests myself with a hundred and fifty colonies of bees along the side of a two-acre vineyard, from which I harvested a good crop of grapes, and with this experience before me I feel absolutely safe in saying with the Government investigator, "Bees never injure sound grapes." As to bees damaging other fruit, it is hardly worth while to discuss it. While a bee's mandibles are very strong, yet they are not suited to cutting, as anyone may see by examination with a microscope. The jaw of the worker is not notched but smooth, and bears nothing which has any resemblance to teeth. They would require teeth like a squirrel in order to do much that is charged against them.

Now let us look at the other side of the question. Do horticulturists ever injure the bees? I am forced to say this is sometimes the case. They may not, and in most cases do not, do it intentionally. However, lest some should offend in this direction without knowing it, I want to call your attention to one or two ways in which bees may be injured. There is no question but that spraying has come to stay, but there is a time to spray and a time not to spray. This is true for the good of the fruit as well as the bees. If the trees are sprayed when in bloom, large quantities of bees are sure to be killed. Mr. F. M. Webster, of Ohio, after having made several tests, said, at the meeting of the Association of Economic Entomologists, at Washington, in 1894, as reported in "Insect Life," "I can see no other conclusion that can be drawn from my experiments than that bees are liable to be poisoned by spraying the bloom of fruit trees, the liability increasing in proportion as the weather is favorable for the activity of the bees, and that all bloom must have fallen from the trees before the danger will have ceased." Now, I am not an authority on spraying fruit trees, but I know there is no necessity for spraying any kind of fruit trees or vines when in bloom. Lest this conclusion should seem unwarranted and not founded on fact, I call your attention to the following quotations:

"With the apple, in spraying for the coddling moth, two applications should be made, the first after the falling of the blossoms, or when the apples are about the size of peas, and the second a week or ten days later."—Farmers' Bulletin No. 7.

"The trees should not be sprayed while in blossom for the spray may injure the delicate parts of the flower and the poison may kill the bees and other insects that play an important part in fertilizing the blossoms."—Bulletin No. 86.—New Series, N. Y., Geneva Station.

Here is a point to which I call your special attention; the "spray may injure the delicate parts of the flower." A Mount Vernon pear tree at Geneva, New York, was sprayed continuously for eight days, the entire time of blooming and not only was no fruit set, but the tree's foilage condition impaired. Report Sec. of Agr., 1896, page 247. I might remark also that the late Prof. E. G. Lodeman, of the Cornell Agricultural Experiment station, issued a spray calendar, and in not a single case does he recommend spraying trees when in bloom.

Here we have the facts clearly set before us. He who sprays the bloom not only runs the risk of killing the bees, but destroys the possibility of a fruit crop, thus thwarting the very purpose for which the spraying is done. Great damage is also frequently done the bees by making cider or wine in the open air.

BEES BENEFIT HORTICULTURISTS.

Are bees of any benefit to horticulturists aside from the honey they produce? I have already suggested that the flower means more than is popularly supposed. The poetical idea is that they were made to beautify the earth. Ruskins says the flower is the end of the plant's being. This idea may be artistic, but will not bear the light of modern investigation. The flower is a means to an end, and not the end. The circle is complete when the fruit is matured and not before. Mary Howitt, who probably knew more about poetry than she did about modern science, wrote:

"God might have made the earth bring forth
Enough for great and small,
The oak-tree and the cedar-tree.
Without a flower at all.

We might have had enough, enough
For every want of ours,
For luxury, medicine and toil,
And yet have had no flowers.

* * * * * * * * *

Our outward life require them not—
Then wherefore had they birth?—
To minister delight to man,
To beautify the earth."

Another poet says:

> "Not useless are ye flowers! though made for pleasure;
> Blooming o'er field and wave, by day and night.
> From every source your sanction bids me treasure
> Harmless delight."

The poetical theory appeals to man's egotism, as he likes to think of everything being made to gratify his wants, and he is loath to give it up; but there can be no doubt, in view of all the known facts, that flowers are the result of a process of evolution, or natural selection, and have a utilitarian end. If flowers had all been created at once as they are, then we might entertain the beauty theory, but they were not. Modern science looks upon all that is, as the outgrowth of all that has been. What then is the real mission of the flowers? In a word, the perpetuation of the species. The flower as I said before, is a means to an end, and that end is the production of fruit, the maturing of seed. To reach this goal nature bends all her energies, and whatever beauty accompanies the process or whatever joy the human family may get out of the same, is secondary and purely incidental. For some inscrutable reason an all-wise Providence has planted two elementary plasmic forces in the world which are so differentiated that we name them male and female, and in most cases the play of one upon the other and a union of the two cell-entities is necessary before a new being can be developed, but this is not true in all cases. Why it is that the union of these protoplasmic cells is necessary as an intitative to the beginning of a new individuality is an interesting philosophic question, but is of no practical utility to the operative horticulturist. It is enough for him to know that when the union is properly formed, the vital energies of the plant or tree at once begin the process of cell building, and the life-producing forces of nature play about this common center, gathering nourishment from the soil and air, digesting and assimilating it, until the new peach, apple, berry or whatever it may be, is formed. That which interests the practical fruit grower is to know if there is anything that he can do to aid in the wonderful process of fruit building. I think there are ways in which such aid can be furnished.

Whatever facilitates pollination increases the possibilities of perfect fruit production. This is a condition and not a theory with which we have to deal, and knowing the ulterior facts it will be acknowledged to be a self-evident truth that whatever promotes pollination is beneficial to the plant. It is not necessary in this presence for me to tell of the various methods by which pollination is secured, or to explain the delicate and interesting process of fertilization. Every careful observer knows that pollination in some cases is accomplished through the aid of the wind, in others by mechanical contrivances, and in many by the aid of insects, such as ants, wasps, and bees. The horticulturist probably depends more on the honey bee than all other instruments combined. Some plants and shrubs are not self-fertile, for illustration, the Bartlett pear, and depend on the possibility of having the pollen of other plants of the same family brought to them in order that they may produce fruit. Perhaps it will be asked why this is true, and I might give the usual answer as to the importance of what is known as "cross fertilization," and the great danger of close breeding. There may be, and no doubt are some serious objections to what is known as "in-and-in breeding," but it will not explain everything. The ultra Darwinians in my mind have tried to make too much of this. In-and-in breeding is not always an injury. We have gotten some of our best cattle, horses, hogs and sheep in this way. The danger does not always lie in the process itself, but in the lack of intelligent direction along this line. There is great danger of perpetuating and intensifying weakness, if scrupulous care is not exercised. In some cases cross fertilization is not possible, and in others no fertilization at all is necessary in order to produce offspring. Every botanist and every student of the beehive as well, knows that this is the fact. It remains true, however, that in most cases cross fertilization is beneficial, and in some cases, as I have already remarked, it is absolutely necessary. As early as 1761 a German scientist said, "Nature appears to have designed that no flower shall be fertilized by its own pollen." Botanists tell us that there are two effects of fertilization, the production of perfect seed and the development of the ovary, and sometimes the receptacle, as in the case of the strawberry and the fig.

The quantity of pollen brought to the stigma in many cases is of vital importance. Prof. Munson says, "In some instances the size of the fruit seems to be in direct proportion to the amount of pollen used, while the form is much improved by an abundant supply." The experiments to which he refers were made mostly with tomatoes, but his statements will apply with equal force to other fruits, and here is where the busy bee gets in her work. She not only brings pollen, but she brings abundance of it to the waiting and receptive stigma, and so improves the form and size, and quality of the fruit, for, as I remarked before, the effect of fertilization goes beyond the mere production of seed. Given a cold, rainy, damp spring, such as we had this season, and the lack of an abundance of pollen will be clearly seen in the fruit which is produced. Imperfect pollination means imperfect fruit, and poor keeping qualities, such as we find in the apples of northwest Missouri at this time.

Speaking on this subject Prof. Clarence Weed has the following: "Few people realize the extent to which man is indebted to insects for his own subsistence. A large proportion of the fruits and vegetables upon our tables daily is the direct results of the pollinating efforts of the bees and their allies. One of the most common causes of the whole or partial failure of the crops of orchard fruits is the inability of the bees to do their work on account of rainy weather." As an illustration he says in '94, in southern New Hampshire it was favorable for the work of the bees for at least two weeks and the result was an extraordinary crop of fruit. In southern New Jersey during the same season there were frequent and heavy rains and the result was a marked failure of crops, due very largely to the prevention of pollen distribution. As many of my hearers are well aware, the same condition of things prevailed in many portions of Missouri this year during the period of fruit bloom and the result was the same as in New Jersey in '94. It seems to me that such facts as these cannot be ignored by the intelligent fruit grower.

Some one may be asking in his own mind the question as to how he is to get a start with bees. To this I would reply, if you have never had any experience with them, purchase one or two colonies only, as near home as you can, and then buy a good book on the subject, like Langstroth on the Honey Bee, subscribe for one of the many good bee papers, read up the best you can, study your bees as well as your paper and book, and by the time you have learned to manipulate them properly your two colonies will have increased by swarming, sufficiently to soon give you all the bees you want. If you have a large orchard and no time to devote to the care of bees, it will pay you to offer someone who understands the business inducements to locate an apiary near you.

Just one word of caution, however, before I close. Do not get an idea that bees will "work for nothing and board themselves" and you need not give them any special attention. You may be disappointed if you entertain this notion. EMERSON T. ABBOTT, St. Joseph, Mo.

Violin solo.—Miss Gertrude Bell.

AQUATIC PLANTS.

In all the vast expanse of Byron's varied and beautiful poems, there is nothing so sublime in conception as his description of the ocean. Its dark caverns, its boundless shores, its pearls that lie so deep, yet are so precious, its coral reefs, and its wonderful plant life. But the ocean is turbulent in its nature, tossing its mountainous waves far into boundless space, there is naturally a feeling of awe, of fear and of unrest that must mingle with our ideas of sublimity.

At the world's great exposition, located on the shores of Lake Michigan. This beautiful lake with sails unfurled and gliding softly yet swiftly over its blue waters, gave a restful spirit to the vast throng of weary feet that crowded its shores. Realizing our limited time for even a bird's eye view of all the marvelous attractions around us, yet we lingered on the lake shore to indulge in quiet interchange of thought, and to enjoy the restfulness of the lake view.

Botany teaches us that plant life extends over almost the entire surface of the globe, even the waters of the polar seas have their algea or sea weeds. Our own native lakes and small streams send forth from the very rocks beneath their waters wonderful aquatic beauty. When we reflect how essential, both in art and nature, some representation of water is to the perfect beauty of a landscape, we are led to wonder that so little effort is made to add this attraction to our many well kept lawns.

In complying with the request to write a paper of my personal experience with aquatic plants, I must tell you of a lily pond on our lawn with a fountain in the center. this fountain is built with ornamental rocks and shells around a water pipe which has a spray on top. In the crevices of these rocks, moss mixed with earth was placed, in which grew Parrot feather, Lycopodium, and green tufts of Forget-me-nots. These plants fell gracefully in festoons over the rocks, adding greatly to the beauty of the fountain. There is also a thin ledge of rock projecting on the east which caught the spray from above and would overflow, making a minature waterfall, which was very much admired. This pond with the fountain in the center is fourteen feet across, in a circle and two feet deep, walled up with brick and cemented, and with a granitoid border a half foot wide, all around. In this water last summer grew and bloomed some of the rarest varieties of water lilies in the known world. There were five blue Nymphae Zanzibarensis from Zanzibar, Africa. The Nelumbian Speciosum (or Egyptian Lotus). This lily was cultivated in Egypt in ancient times where its seed was known as the "Sacred Bean." It is the Sacred Lotus of India and China and is also cultivated in Japan. This wonderful plant, though transplanted from such tropical and semitropical regions, has proven to be entirely hardy in our climate, enduring any degree of cold, free from actual freezing, with both leaves and flowers standing above the water. The Egyptian Lotus makes a most tropical appearance and is considered the grandest and most desirable of all our water lilies. There is also in this collection two Nymphea Oderata Rosea (or the pink Cape Cod Lily), two Marhacea Chromatella, one Nelumbian Lutium (our own Native yellow), Nymphae Oderato (our native white), two Nymphae Devoniensis and two Nymphea Lotus, one Nymphae Rubra and two Sturtevants.

All these lilies were planted in large buckets or small tubs and were placed about in the pond as they would bloom best in mingled variety of color. Many of these lilies were night blooming, especially the more tender varieties and if you want to behold a lily garden in perfection, allow an electric light to be thrown upon the lawn about nine oclock at night, when a number of these night blooming beauties are unfolding their buds. The celebrated historic "Papyrus plant" of which the Egyptians first made paper, stood erect above the water about two feet. The lotus leaves, as well as the Lotus bloom, always stand above the water, while most of the water lily leaves in all their varied shades of color lie out on the surface of the water and are beautiful even without a bloom. These lilies were put into the pond in April and by the middle of June there were from five to eight blooms every day. The most satisfactory were the Egyptian Lotus already described Nymphae Zanzibensis, Nymphae Lotus, Nymphae Rubra, Marliacea, Chromotella and Nymphae Devoniensis. There were other varieties of red, white, and pink but none gave such constant bloom.

To have an aquatic garden is not without trouble and work. There are enemies to aquatic plants—worms, still water, and rich compost favor the growth of a low form of vegetable life called confervae or green scum, which becomes very unattractive unless eradicated. I feel satisfied, however, if an abundance of gold fish with some of our spotted sun perch, are kept in the pond, there will be no trouble in this direction. I have been pleased to read recently that the superintendent of our government grounds at Washington proposes to add a large collection of aquatic plants to the already beautiful flowers and shrubs displayed there.

In short, this interesting study is becoming more universally popular every day and there is certainly nothing in plant life that will give more pleasure for the expenditure than a collection of aquatics.

MRS. G. C. BROADHEAD, Columbia, Mo.

THE LANGUAGE OF NATURE.

Man makes known his wants, manifests his pleasure and communicates his ideas through the medium of speech. In nature, trees and plants express their wants and ills through the medium of signs, a mute, but no less expressive language than that used by man, and he who is versed in it, will as readily understand the one as the other. But while man may learn his own language during the space of a few years, he can learn but a small part of natures language during his life. The student of nature who has acquired sufficient knowledge to interpret many of her signs, can indeed see "sermons in stones and books in running brooks."

No doubt what I shall say upon this subject is known to most of my horticultural brethren; but there are beginners, who, I hope, will herein find some helpful hints, and by exercising their powers of observation, memory and reasoning, it will soon be apparent to them also that "he who runs may read." A plant by aid of its wilted leaves signals that it is suffering with thirst, or through its blackened leaves gives notice of the deadly touch of Jack Frost. So other ills are revealed by kindred signs, and as we in mature years learn more of natures language we find ourselves not only admiring God's handiwork in nature, but are also forced to the conclusion that plants and trees are not quite the inanimate things that in our youth we believed them to be. We know that some plants are sensative to the presence, and some to the absence of sunlight, as many of our familiar flowers such as Four O'clocks and Portulacca's exemplify. Others are sensitive to the touch, as the several species of sensitive plants, and in a most remarkable degree that singular plant, the Venus Flytrap, (Dionaea Muscipula), whose leaves resemble two minature hands on one stem, with fingers extended, suddenly close when their surface is rubbed, often thus imprisoning crawling insects. But to return to my text.

One versed in this sign language of nature can determine which is the north side of a young nursery grown tree, as well as that of an aged tree in the forest. He can describe the root formation of a tree by seeing its body and top. The roots of a young tree will disclose to him whether it was grown in clay or in black soil. He can tell whether a peach tree was grown in a prairie country or not. That a tree was or is planted too deep. A section of a limb reveals to him that the tree stands in sod. He can tell which side of a pear tree will die first. He can point out a hundred yards away, the trees that were injured by borers, or rabbits and mice. By the leaves of a tree he can tell what kind of season prevailed. By the leaves of another, that it was topped off too short and too late in spring. That the wood of a tree or a limb is diseased, although it may appear sound externally. By a branch that a grape vine has not been pruned for years. That one bunch of grapes came from an old vine, and another from a young one. He can tell from average samples of apples that the tree was overloaded; that they grew beneath or above the foliage; on young trees or on old ones, or on a diseased tree; whether they were gathered early or late: grown on a high or in a low situation; in the open or surrounded by a forest; and that the orchard has been allowed to grow up in weeds and brush.

Now as to the signs which nature employs to inform him of her habits and needs. In school we were taught that the north side of a tree in the forest can be detected by the moss which grows on the bark on that side only. On a young tree from the nursery the north side can be detected by the color of the body and limbs which is lighter on that side. We find that by the external appearance of a tree we can judge of its condition, and that the roots of a tree correspond in a manner with its top. Low branched spreading trees, like the apple and quince, have spreading, shallow roots. Others of lofty growth, like the pear, are deeply rooted. That the top of a tree dominates the roots is known. Take a seedling peach tree, nip off all limbs as they appear, and the body will be simply a pole with a long tap root. Allow all limbs to grow and there will be numerous strong branching roots. We find also that most leading limbs on a tree are fed by a corresponding root, and where a prominent low limb extends to a certain point of the compass, a prominent root extends in the same direction.

I am well aware that there are exceptions to these rules, but in a general way they hold good, so much so in fact, that in digging blackberry plants (suckers) my spade is put down at a right angle to the direction in which the lowest (and generally the strongest) limb points, as it reveals the direction of the leading root. The roots of young apple trees grown in black soil will be soft, numerous, fibrous, evenly distributed, long and yellowish in color, while those grown in clay soil are harder, not so numerous nor fibrous, irregular and of a reddish tinge.

A peach tree grown in a prairie country will be bent to the north by the blowing of the almost continuous south winds during the growing season. An apple tree planted too deep may live four or five years, and when dead shows a bungshaped tapering of the body from the soil surface to the roots. During heavy rain and windstorms the top of such a tree will sway about and its body form a funnel shape hole in the ground. Plum and cherry trees planted to deep will send up suckers from the roots, whereas (when budded on non-suckering stock) rightly planted they will not.

The limbs and bodies of trees, especially of peach, apple and cherry when allowed to stand in sod for years, will be covered by a gray lichen, an evidence of their impoverished condition, due to the grass roots robbing them of moisture. The limbs of an evergreen growing in sod are of a puny, short growth, and lack that rich, glossy green color. If a pear stands so that on one side the soil is lower and cultivated, and on the other side is higher and in grass, the side toward the cultivated soil will die first. But even when not cultivated, that side will die first, on which the roots are on a lower plane, especially if in a slight depression. The cause is a surplus of water.

A borer at work in a tree will cause the leaves to turn a paler green, easily recognized at quite a distance. It will also cause an otherwise healthy looking tree to bear heavily before its time. On a tree badly barked by rabbits or mice, the leaves will wilt, and in a short time turn brown, as if struck with blight. During a prolonged spell of wet and cold weather, peach leaves will curl and twist, and have a blistered appearance. The leaves of apples and other trees will have a lighter color, thinner texture, and the under side appear mildewy, while rust spots will be found on them and along their edges. In a prolonged hot and dry season many of the leaves turn yellow and drop before their usual time. A box elder topped off too short and late in spring, will manifest his misery by short, tightly curled, crinkled leaves. In a year or or two after a too late and heavy topping all kinds of shade trees so mutillated will enter a melancholy protest, by gradually casting off parts of their borer eaten bark, on the southwest side of their bodies. A tree or a limb apparently sound, is diseased if the bark has a dark appearance, as if covered with soot.

A grapevine left unpruned for years, will have short, puny growths of new wood, many of which will die at the beginning of fall and during the winter, from inanition, and the leaves will be much smaller than those on pruned vines. A bunch of grapes from an old vine, and another from a young vine of the same variety, although grown only a few feet apart, and under the same treatment, will show this difference: The bunch from an old vine will color up and ripen earlier. This same rule applies to other fruits. On an overloaded apple tree the fruit will be smaller, contain a large proportion of apples lacking in color and flavor, are not even in size, and will be less tender and crisp. Apples grown beneath the foliage, if entirely shaded, are almost devoid of color and lack flavor; if partly shaded, show lighter spots, caused by a leaf or a limb shading it from the sun. Those grown above the foliage are highly colored and flavored. On young trees the apples are very large, sound and perfect in form, and the flesh is tender and lighter in color than those on old trees. On old trees the flesh of the fruit is deeper in color, more imperfect, and stung by insects. On diseased trees the apples are more or less deformed, stung by insects and inclined to rot at the core. If apples are gathered too early, they will be lacking in color, size and flavor, but will keep longest and retain their juices best. If gathered too late they will have gained in size and color, but will soon turn dry and mealy, and lose in flavor. Grown on a high location, apples will be highly colored, and possess a clear skin. Grown on low land near water, the fruit will be partly covered by dark blotches (which can be rubbed off) is generally larger, but the color and flavor not equal to those from higher elevations, and is not apt to keep as well. In open or exposed locations, the fruit is generally of high color and clear skin, and more free from the attacks of insects and fungi. If surrounded by timber, the fruit will have a sooty appearance, and the leaves and limbs to some extent also.

If the orchard has been allowed to grow up in weeds and brush, or blackberries, the apples will be scabby, under size, and poor in flavor.

Before closing, I will give some facts regarding these last two items:

Some years ago, during the month of August, Mr. A., a fruit grower, brought some specimens of very scabby and small apples to Mr. B., another fruit grower, asking for the cause and a remedy. He said his apples had been scabby for several years past and that he had tried spraying. Being asked with what solution, he answered: "London Purple!" He was told that he had used the wrong solution, and that tall weeds or brush probably held possession of his orchard. This Mr. A. denied, and claimed his trees were in their prime, and kept cultivated. Investigation revealed that throughout the orchard, blackberries had been planted close up to the trees, and had borne several crops of berries. He did not, it seems, consider blackberries as weeds or brush. Nor did he realize that the blackberry roots were robbing his trees, and choking the life out of them.

At a horticultural meeting in September, 1897, a visiting fruit grower exhibited some very fine Maiden Blush apples. Mr. B., who admired their size, said they must be from young trees, growing in rich, and probably new land. The fruit grower answered "yes, one can tell by their unusual size that they are from young trees, growing in rich soil." Mr. B. then added, "your orchard is either entirely surrounded by a forest, or on at least three sides, with the east side open." The astonished fruit grower frankly admitted that his orchard was surrounded by a forest on the south, west and north, and asked Mr. B. (whom he knew had never seen the orchard) how he had arrived at the conclusion? Mr. B. answered: "Your apples are covered with a kind of sooty like fungi, as if black ened by coal smoke. This is due to fogs, wet weather and dews, and if an orchard is surrounded by a forest, so that the prevailing winds are prevented from dispersing the fogs, and the moisture arising from rains and dews, the apples will be discolored like yours."

CHAS. TENBUER, Lexington, Mo.

TANEYVILLE, Mo., November, 1898.

To the Missouri State Horticultural Society: By request of your secretary I will write a short article on most of the Wild Fruits of Taney county, Missouri.

The Wild Strawberry grows here quite plentifully and the people gather and use quantities of them, they are fine in quality, but it is not advisable to grow them, as the tame varieties are so far superior to wild ones.

Dew Berries are a wonder, if a field is neglected it is covered with Dew Berries. I have seen the vines not over one foot long and then again have seen them over twenty feet long loaded with large fine berries. They are so abundant that the children gather them and sell them for ten cents per gallon and I believe that by care in cultivating they can be much improved in size and quality.

The Gooseberry grows here in plenty, but I think it is advisable for us to plant and grow the Downing or Houghton.

June berries or Sarvice berries grow here but the people hardly know what they are. A woman that knows how to use them can get up a fine dish of sauce or a pie as good as the best. The cultivated ones sell easily and are wonderful bearers.

Mulberries are plenty in the timber on the low land and are of fine flavor. I shall try them under cultivation.

Black berries grow here in great profusion and are sold at ten cents per gallon and are fair in quality, but I think the Kittatiny or Early Harvest are better to cultivate.

Plums I have seen but few and they have been small and inferior.

The largest and finest crab apples I have ever seen were grown here. I shall get scions and grow the fruit here for home use, for to me the sauce in spring is superior to any other apple.

The wild grape grows here in great abundance and of several different varieties. The earliest are quite sweet and ripe in July, other varieties come on in rotation until the small sour grape is ripe, but the tame grape does so well here and comes into fruiting so soon after being set that the wild grapes are for the birds.

Pawpaws, how abundantly they grow on the banks of the rivers and creeks, in the rich soil. They should be called custard fruit. I am very fond of them when fully ripe and have gathered them that were six inches long and seven and one half inches around. Cut them in two with a knife, take a teaspoon, sit in the shade in a hammock and eat the finest custard you ever tasted, also the richest. I shall see how they will do up on our mountain.

What great quantities of persimmons grow here. Trees loaded with fruit. The fruit begins to ripen about October the first but what a difference in the size and quality. I have gathered fruit that measured five and one half inches around and of fine quality, but they grew on rich ground and were cultivated and these trees were loaded with fruit. The freezing weather we have had improves the flavor of the fruit very much and the fruit will hang on the trees and keep getting better until February. I think the paw paw and the persimmon would be desirable to grow for market.

I have not found any black and red raspberries growing wild here. This is a wonderful country for all varieties of tame fruit that grow in a temperate climate, but many of the old settlers who have lived here forty and fifty years have never grown any fruit of any kind.

N. A. Reeves, Taneyville, Mo.

After some remarks by Pres. Murray, Mr. Nelson moved that the session be extented in order to hear Mr. Butterfields' paper. Mr. Evans seconded the motion and it was carried.

FRUITS IN ALASKA.

To the President and Members of the State Horticultural Society. After consenting to write on my Northern trip I was at a loss what to write and what not to write as it was all interesting to me, and I realize that your time is valuable, especially at a State meeting, hence I will make my remarks as brief as possible and leave out the details of my trip. Leaving Kansas City February 7th., we went direct to Seattle. From there to Vancouver a distance of one hundred miles through the greatest timber country Iever saw. It was nothing uncommon to see Hemlocks measuring eight to ten feet in diameter and 200 to 300 feet high. After purchasing sleds, horses etc., and a years provisions we boarded the Steamer Packshan and were soon on our way up the coast, keeping to the right of Vancouver Island, which is some 300 miles long. We then crossed Charlotte Sound and wending our way through islands and channels and magnificent scenery we arrived at Fort Wrangel 800 miles from Vancouver. We arrived there at night and next morning the ground was covered with four inches of snow which soon melted away under a warm sun. Fort Wrangel is situated on Wrangel Island, an island about twenty-eight miles long and eight miles wide. The surrounding country is all hills and mountains covered with timber, mostly pines, spruce and hemlock, some of which were very large, three or four feet in diameter. Here we saw the Totem Poles and for the first time I appreciated Longfellow's poem:

> "And they painted on the grave-posts
> Of the graves, yet unforgotten,
> Each his own ancestral *Totem*,
> Each the symbol of his household;
> Figures of the Bear and Reindeer,
> Of the Turtle, Crane and Beaver.

Leaving Wrangel on a small boat we were soon on Cottonwood Island (but I never did learn why it was called Cottonwood as the timber was nearly all Balm of Gilead.) This Island lies at the mouth of Stickeen river and going to where the ice was solid we began our journey on sleds.

TIMBER.

One noticeable feature of the timber of this country was the limited number of varieties. In deciduous trees I will name Balm of Gilead, Aspen, White Birch, English Alder, Common Yellow Willow and a few specimens of Soft Maple. The Balm of Gilead along the Stickeen river were very large, three or four feet in diameter and 80 to 125 feet high. The bark was four or five inches thick and cracked so as to come off easily. It made the best of fire-wood making a very hot fire. Of Evergreen trees there were the Norway, White and a few specimens of Colorado Blue, Spruce, Hemlock, Pine and Juniper. On the mountain sides we noticed the Trailing Cedar, Juniper and Arborvitae. As we went farther in the interior we found only the Spruce, Pine and Willow and some White Birch. After going some 500 miles inland we noticed the limbs were very short being not over three or four feet long at the ground and scarcely twelve inches at the top, while the limbs on the south side were longer than on the north side. The Cones of the Spruce provide food for the squirrels and they will pile them several feet high at the foot of the trees.

FRUITS.

Owing to the ice and snow we were unable to observe any fruits until we were two hundred miles inland. As we were previously informed by some Indians that none of the fruits of that country were poisonous we tasted each new kind. The fruit grows on bushes and vines near the ground except the high bush Cranberry which grows two to four feet high. However I will make two exceptions—in the valley of the Tahltan river I noticed the Black Choke Cherry on bushes six to eight feet high and one clump of Sarvis Berry. The wild Strawberry seems to be at home there and grows nearly everywhere. The fruit ranging in size from very small, on poor land, to berries of good commercial size on rich land, and all of the highest quality. They begin ripening on the low lands June 12 and continue to September 15 on the higher altitudes. Of Raspberries we only noticed the red varieties and these only on the southwestern slopes of the hill sides. The bushes, about twelve to fifteen inches high, were full; the berries being of good size and of the best quality. There were two varieties of Cranberries, the high bush and the vine. The high bush grows everywhere and the fruit is edible but not relished by some. The berry will hang on all winter and when mixed with apples it makes a good sauce. The vining or trailing Cranberry bear quite plentiful in places and are about one half the size of those we see on the market here, but of much better quality. The Blueberry was plentiful, growing on bushes about one foot high. There were quite a number of other small fruits that I never saw before. One, they called the Mulberry but I think improperly named as it is a perennial growing only four to six inches high with five leaves and a red blossom and bearing one single berry about the size of a blackberry only red and very good quality. The Currant seemed to flourish, especially five hundred miles inland where they were a sight, bushes laden down with fruit. The bunches and berries were large and I was so favorably impressed with this fruit that I carried some of the plants home, three thousand five hundred miles, and will test them here. The Black Currant were also full and quite plentiful but we did not care for them when we could get the red variety. At Fort Wrangel in the woods I saw the wild Crab apple and on one lot in town I saw an apple tree apparently about four years old and full of small red apples. I also saw Cherry and Plum about the same age in good, healthy condition. Here we saw another Blueberry different from the variety we saw inland. The fruit was about three times as large as the other and grew on bushes four or five feet high. Another fruit that grows very plentiful in that country is one called Bearberry.

This tastes more like quinine than anything I know of and as I am not fond of quinine I did not eat many. The bears, however, are very fond of them and will sit and strip the fruit off and eat them and grow fat. Bear meat is especially good after the berry season.

FLOWERS.

The common wild Rose was very plentiful and the bloom was perhaps a brighter red than ours and very fragrant. After it sheds its bloom a berry forms about the size of a pecan nut being edible and very nourishing. I ate some with relish and the bears and grouse are very fond of them. They hang on the bushes all winter. The Fireweed probably takes its name from the fact that it springs up where the fire has passed through the timber. The plant is an annual and grows from one to three feet high. It blooms in great racemes of bright red flowers continueing in bloom a long time. I have seen hundreds of acres of this flower in bloom and it was a beautiful sight to behold. The wild Pea, a bright purple flower, is also numerous and the flowers are good to eat. It was nothing uncommon to see the Indians going along eating Peaflowers. I will also mention the Kinnikinic, a small bush with bright red wood, dark green leaves and pure white flowers in the summer while in the fall it has pure white waxen berries. Both the flowers and berries make a beautiful contrast with the red wood and green leaves. The Indians use the bark of this bush as a substitute for tobacco.

Besides the above there is an endless variety of the most beautiful colors that would have to be seen to be appreciated.

BIRDS.

One great benefit of this vast northern country is that it affords a home for the birds and fowls where they can go and raise their young unmolested. The first bird was the Raven, then the Snow-bird but different from the Snow-bird here, being somewhat smaller and more white and altogether a much prettier bird. They were very tame and would come right up to our camp for crumbs. I would like to have brought some home but did not have the heart to kill them as I liked their company. We saw several white Quail, or nearly white, larger than our Quail and had feathers on their feet and legs. The Owls were white and their hoot was familiar but stronger than the Owls here. The Magpie were plentiful. The camp or Meat birds were very tame and would fly into our tents to steal meat. The Robins were everywhere and would always sing for me while I prepared breakfast (I usually got up at 3 o'clock). There was also a large variety of other birds among them the Cat bird, Thrush, French Mocking bird, Bald and American eagles, a large variety of the Hawk family and Kingfishers. I almost forgot to mention the Grouse or Pheasant of which there were four species. One the Indians called the Black Chicken would net about four pounds. They were all very tame and when I came out this fall I saw them in droves of ten to fifteen each. At our farthest point north we came to where the ducks and geese raise their young and could kill them with clubs.

GAME.

While it is a little out of my line I will say a word about game and fish. Along the coast there was plenty of Deer but we saw none inland. The Moose, a large ugly animal, weigh from 400 to 600 pounds net and the meat is of the best quality. The Cariboo were numerous in early spring but went to the mountains where they raise their young. They were about double the size of Deer. Moose and Cariboo furnished the most of our meat while there. Rabbits were not plentiful as there had been some disease which swept them off a few years ago. Bear were quite plentiful but very shy. I saw some that would weigh 600 to 800 pounds. Beaver and Otter were plentiful, also Red, Silver and Grey fox. The fur of the latter is very valuable bringing from $90 to $150 each. Wolves and Wild Cats or Mountain Lions were plenty, and there were some animals I did not know.

FISH.

We only found salmon as far up the Stickeen river as 160 miles from the coast. At the mouth of the Tahltan river the Indians have a Reservation from the Canadian Government and they would catch vast numbers of fish and dry them for themselves and dogs. They congregate here in June and have large shacks built of poles and covered with evergreens and brush. After the fish are dried they are put in cold storage in the ground, each family having their own cellar, and for security against the wild animals they cover them over with stones. They keep well this way and furnish the greater part of the living. Farther in we saw the Arctic and Dolly Varden or Spotted Trout. The Arctic weigh only one to three pounds and are easily caught with a fly hook. To catch the Dolly Varden we baited with bacon and it was nothing uncommon to catch them weighing eight to fifteen pounds, and one we caught measured thirty-six inches long and would weigh twenty pounds. In Dease Lake we found plenty of White fish and some Pike.

CLIMATE.

The weather along the coast was very disagreeable in March; snow and rain. Going through the coast range of mountains the snow was very deep say four to six feet and drifting in places ten to twenty feet but as we went inland the snow was less and very little rain. When we arrived at the Tahltan river, April ninth, the snow was all gone except on the north hillsides. The ground was warm and pleasant and we would have made garden if we were going to stop there. We found one man making garden some four miles farther on. He was planting potatoes and was preparing to irrigate his ground. When I came out September fifteenth I stopped and got some of his potatoes and they were very fine, some would weigh two pounds, dry and mealy. There had been no frost to kill the vines at that time. We also noticed some good gardens at Laketon on Dease Lake, at an altitude of 3,100 feet. The garden here consisted of turnips, raddish, rhubarb, lettuce, peas, etc. We also found the red raspberry growing wild here and very plentiful. We found another garden at Liard Post, the junction of the Liard and Dease rivers. The man who kept the store for Hudson Bay Company had a small garden but the climate seemed to be much drier here and he had to carry water from the river. We also found potatoes here on coming out, but they were not so large as at Tahltan river. We met two parties from Iceland and they expressed their opinion that the country would some day be inhabited as the climate was about the same as their native land.

Going north from here some 200 miles the climate seemed very dry and forest fires were raging in the different sections which made it very smoky. On the bare mountain side the bunch grass grew quite plentiful and apparently identical with the Colorado bunch grass we see out West while along the rivers and in favorable localities we saw plenty of Red Top and in places it grew five and six feet high. I saw one horse that was lost the fall before and came through the winter in good condition, and that is saying much for that cold region that we hear so much about. From March first to September twenty-fifth we only saw one night cold enough to make ice one half inch thick and the hottest day was eighty-five in the shade. An average temperature of fifty-five to sixty-five. The country is mostly mountains except on the high divide where it is swamps and lakes. The hills are covered with pines and aspens and generally a thick growth of underbrush, mostly high bush Cranberry and a bush the Indians call sap-weed. We found the farther we went inland there was more moss on the ground and in some places it was a foot deep making it very disagreeable walking. There are no honey-bees in that country but plenty of bumble-bees of the small species. The bumble bees, however, are not vicious like some I have seen in our hay-fields here.

In conclusion will say I was gone just eight months and gained nineteen pounds in flesh and while in the interior I was not sick a day or had a bad cold and I never saw any one sick. I left my son, Elmer, up there to spend the winter and shall be glad to report how he likes the winter up there at your next meeting. I could say much more about this country but do not wish to take up any more of your time. I thank you for your attention. M. BUTTERFIELD, Lees Summit.

REPORTS OF COMMITTEES.

Mr. Follett, chairman of the Committee to which had been referred the matter of giving proper credit to a member of this Society for his efforts to secure the passage of the bill by Congress to establish Experiment Stations in all the states and territories of the United States, submitted the following report:

Your Committee beg leave to report that they find the facts in regard to the Experiment Station bill to be, that soon after the Hon. Norman J. Colman took his seat as United States Commissioner of Agriculture, at Washington, D. C., he issued a circular to all the Agricultural Colleges of the United States asking them to send delegates from all of said colleges to a convention to be held in the Department of Agriculture at Washington, at a time designated, for the purpose of taking united action for the passage of a bill establishing Experiment Stations in connection with the Agricultural Colleges of the country. This call met with a hearty response from all the Agricultural Colleges, and delegates were appointed that assembled in the Department of Agriculture building in Washington, July 8, 1885.

At said convention the Hon. Norman J. Colman was unanimously elected President, and delivered a lengthy address on the objects of the convention and on the importance of establishing these Stations in connection with the Agricultural Colleges, and urging that the time was ripe for the passage of a bill by Congress for this purpose. The convention was in session for several days, and all matters relating to such Stations were thoroughly discussed.

A committee was appointed to prepare a suitable bill to be passed by Congress, and Mr. Colman was made one of the committee. After the bill had been perfected and approved, a copy of it was handed to Senator

Morrill, Chairman of the Committee on Agriculture in the Senate, and to Mr Hatch, Chairman of the Committee on Agriculture in the House of Representatives, and it was passed without material change by both Houses of Congress, and approved by the President.

As Mr. Colman was a member of this Society, and its first President, and was indorsed unanimously by this Society for the position which he occupied, it seems fitting that the following resolutions be adopted.

Resolved, that the Missouri State Horticultural Society hereby expresses its approval and commendation of the services rendered by the Hon. Norman J. Colman in the cause of Horticulture in the action taken by him in calling a convention of the Agricultural Colleges for the purpose of preparing a bill for the creation of Experiment Stations in connection with the Agricultural Colleges and for the earnest efforts made by him to secure the passage of the bill.

Resolved, that after the bill became a law, in establishing the Division of Experiment Stations for the collections of the results of the experiments conducted at the various stations, and in collecting and preparing them for the popular mind and disseminating them in the widest possible manner, he conferred a great boon to the friends of Horticulture and Agriculture.

Resolved, that in creating the Division of Pomology, and making it one of the prominent Divisions of the Department of Agriculture, Gov. Colman was filling a long felt want, and that his appointment of Prof. H. E. Van Deman at the head of that Division met our cordial approval.

Resolved, that in establishing the Section of Vegetable Pathology and placing it in charge of Mr. B. T. Galloway one of our own citizens, admirably qualified to discharge the duties of the position, Mr. Colman exhibited a due appreciation of the wants of the Agriculturists and Horticulturist and his action met with our hearty commendation.

J. B. Follett, Chairman }
C. H. Dutcher } Committee.
H. J. Waters }

Secretary Goodman:—The statement that Gov. Colman was the first President of this society is one of which we are all proud, and are glad to do him honor but there is also another man who has long been a member of this society, honorary member also, and one who has always taken a great interest in the fruit grower's work. As a state officer he has many times given evidence of his friendship to our society when we have been at Jefferson City or needed assistance in getting our appropriation. I refer to Hon. A. A. Lesueur, Sec. of State.

At the time when it seemed imminent that the Society would not receive its usual appropriation, because of its failure to be incorporated and recognized as one of the state institutions, it was then that our friend, Secretary of State Lesueur stepped in and prepared a bill recognizing our society as a State institution and appropriating money for its support and maintenance.

It was then almost at the last moment of the session, that he prepared the bill and the *act of incorporation*, and helped to get the bill through the Legislature, by which the Society was saved from disorganization.

N. J. Colman rightly deserves the name of *Father* of this society but A. A. Lesueur deserves the name of *Savior* of our society and we can, one and all, yes every fruit grower of the state, give him our best wishes and our hearty support in whatever he may ask of us. I am glad to have this opportunity of acknowledging in this public manner our indebtedness to him, for the many good things he has done for the Society and this last assistance in saving the Society, and giving it the means to work with.

FINAL RESOLUTIONS.

We, your Committee on Final Resolutions, make report as follows;

Resolved, That the Missouri State Horticultural Society is under great obligations for, and does hereby express its high appreciation of the cordial welcome that has been extended by the citizens of Columbia, by President Jesse and members of the faculty of the State University.

Resolved, That the State Horticultural Society is glad to express at this time its great pleasure in observing the excellent work that is being done in the University, and particularly in the Agricultural College and the Experiment Station, in advancing the rural educational interests of the State.

Resolved, That our heartfelt thanks are due and are hereby extended to Christian and Stephens' Colleges of Columbia, and to others for assistance with music and recitations on the program of the meeting.

Resolved, That we express our obligations to the press and railroads of the State for greatly appreciated courtesies.

Resolved, That the Missouri State Horticultural Society hereby expresses its high appreciation of the inestimable and lasting benefit resulting to the horticultural interests of the State, and indirectly to all of our interests from the splendid work done by the Committee on Horticulture at Omaha.

Resolved, That it is the sense of the Missouri State Horticultural Society that the school laws of Missouri should be so changed as to permit the teaching of the principles of agriculture, horticulture, domestic economy and shop work in the district and high schools of the State.

Resolved, Further, that State aid should be given where it is necessary for the maintenance of a system of county high schools—one in each county— which shall include in its regular course of instruction the principles of agriculture and horticulture.

LEVI CHUBBUCK, Chairman.
JOSEPH BAUMGARTNER,
R. J. BAGBY.

The following resolution was offered by Dean Waters, and the motion to adopt it was carried.

Resolved. That an effective means of dissemination of information which will greatly advance the cause of which this society is the champion, will be the making of plantings in school grounds, and in public parks of groups of plants, arranged according to botanical classification.

Resolved further, That this society take steps to prepare a guide for the use of school and park authorities in making such plantings.

FINAL WORDS.

Mr. Van Deman:—I will only say you have had as good a horticultural meeting as I have attended in many years, and I have attended many of them. You have some knack of getting hold of the people.

Professor Taft:—I have often wished to come back to Missouri. It gives me double pleasure to come here and meet my old friends. Since I went to Michigan I read your reports with much pleasure. I am convinced you are keeping up with the age. Our society is in session at Ann Arbor, and it sends good wishes for your success.

Mr. Barnes:—It is a joy to meet with the Missouri Horticultural Society, and I want to thank you, but it is late. I will take back with me many a good and new idea. I need many. You are invited to meet with us at Topeka in a few days. I congratulate your secretary. I congratulate myself. When I get into a difficulty I know where to go to find what I want.

Mr. Aldrich:—I do not think I have ever attended a better meeting. I shall never forget the courtesy and kindness I have received.

Mr. Baxter:—This has been one of the best meetings I have ever attended.

Mr. Waite:—When I started, I was reluctant to come, but I have enjoyed the meeting and have profited by it. I have lost a week from my work at Washington, but I have enjoyed it. I can more than make up the time I have lost by the good cheer I have received.

Dean Waters:—Mr. President, and gentlemen of the Missouri State Horticultural Society: It is more pleasure to have you gentlemen here than it is to you to be here. It will be a great stimulus to the workers in the college and the Experiment Station. We can address ourselves to our respective work with new determination. We have learned a great deal. We have been very proud to have you here, and will be glad to have you again. I hope you will come here every few years to stir us up. I thank you for coming.

Professor Stedman:—Dean Waters has made my speech.

Professor Whitten:—I echo the well chosen words of Dean Waters and Professor Stedman. I don't suppose the members of the Horticultural Society can appreciate the value of the good they did in coming here. It is a stimulus to me, and I know it is to my colleagues. I feel that I can now go to work better than I have ever done before.

President Murray:—I am sure we will all be benefitted by attending this meeting. We have never before had so many eminent and able helpers from the University and from other States. We thank all those who have worked so earnestly to make this meeting a success.

Adjournment.

MISSOURI FRUIT, OMAHA, 1898.

MISSOURI PEACHES, OMAHA, 1898.

SOME SPECIAL PAPERS.

SOME SPECIAL PAPERS.

PERSONAL OBSERVATION IN ORCHARDS.

As long ago as I can remember, I had a taste or liking for horticulture, and it was probably caused by reading and remembering a little poem in my first school reader, which reads as follows:

> "Mother, I want a spot of earth
> To sow my garden seeds,
> Where I can plant them in rows
> And keep them free from weeds."

About twenty years ago I discovered the mistake of growing forked trees, and began studying a plan to remedy it. During these last years I have grown two orchards on what I call the new Western plan. The old method I call the New England plan, which has been so detrimental to orchard growing here in the West; and even now it makes me feel sad while traveling about and seeing the thousands of young trees growing that are pruned on the old style and destined to a short life by being split to pieces by the wind. It can all be remedied with less than half the work it requires to do what I call spoil the tree. I said half—yes, you may divide it again and be within reason, for I don't approve of much pruning, especially after the tree is four or five years old.

Now the way to plant is the first thing to do just right and, like the other, is the easiest way also. Start the plow so as to finish each land just where the trees are to be set; then subsoil and throw the bottom of these furrows out again, and then again [illegible] [illegible] twenty inches or more. Now in this furrow put straw all the way from end to end and then [illegible] all the subsoil back and cover the straw. Now the hole is dug, and [illegible] up, and in this place the tree and pull more earth up around it. Then [illegible] few furrows thrown towards the rows [illegible] [illegible] the [illegible].

Pruning.—I do not approve of the old stereotyped plan, [illegible] [illegible] have been open to conviction; so, about fifteen years ago, I [illegible] addition to my orchard. I set two-year-old trees [illegible] [illegible] [illegible] the center, then I watched them grow. [illegible] [illegible] check their growth in the [illegible]. The [illegible] [illegible] [illegible] most of their growth went to the center [illegible] [illegible] [illegible] started another set of [illegible] [illegible] [illegible] [illegible] appeared to grow out almost at right angles with the center. The cut back limbs also took an outward course, but what to do next was a puzzle. This center shot on up and turned over toward the north like a candle wick. Well, I thought to myself, it has now got two good sets of limbs already; that's all right, and you can just go it. So on they went. Now nature comes to the rescue. I soon noticed another set of limbs all coming out on the top or upper side, and they all tried to be centers, while the old center went on over, and became an outside limb. From some of them now I can stand on the ground and pick all the apples. These last limbs took the opposite direction, so the tree sloped, running up, and these last limbs nearly all started off against the wind, and the tree became nicely balanced —the limbs became pendant and springy, and the result was, when we had the most severe storm, on June 24, 1897, that has ever passed over this country in forty years, my orchard came through all right, and I had 1,200 bushels of apples to sell to my neighbors; and again this year I have gathered 250 bushels besides a great many dropped and went to waste because there was no one to pick them up and care for them.

TREES DYING:—Many trees that appear to have stood the storm, are since dying from wind-shaking and being so twisted; so new orchards will have to be planted and grown here before there will be an over-supply. The same cause in other localities has produced the same result, thus people are becoming greatly discouraged about tree planting. There are also other causes for trees dying, and I attribute it to the severe drouths in midsummer. What makes me think so, is because I see many forest trees dying. They are mostly on thin land and have very shallow roots. There are other causes for the Ben Davis dying—that is pruning. When the tree gets along in years I am satisfied Ben Davis won't stand much pruning.

What will prevent trees from dying? On my plan for planting are three reasons: First, The straw being thus deeply covered, will be a long time in rotting. It forms a kind of tile drain; it lets the water move along, thereby keeping it healthy, whereas a dug hole retains the surface water and it becomes putrid and sour, which is not good for the tree. Second, The ground being so deeply stirred, allows the roots to strike deeply into it, they will then follow this fertilizer in the straw, thereby causing the tree to grow very rapidly, and also to be so deep as to more successfully withstand the drouths of summer, and be out the way of the plow. Third, Plant about one rod by two, this has several advantages; it gives a better chance to cultivate and gather the fruit, and affords a better protection. Fourth, Split cornstalks, put on and kept on summer and winter, is the best of all protectors. H. B. FRANCIS, Mulberry, Missouri.

PROPAGATION OF VARIETIES OF FRUIT.

Indeed this subject deserves more careful attention and consideration than I feel able to give it, had I the time.

Fine fruit is the flower of commodities. It is the most perfect union of the useful and the beautiful that the earth knows. Trees full of soft foliage; blossoms fresh with spring beauty, and, finally, with fruit rich, bloom-dusted, melting, and luscious; such are the treasures of the orchard and garden, temptingly offered to every land-holder in this bright and sunny, though temperate climate.

Yet, there are many in utter ignorance of most of these fruits who seem to be under some ban of expulsion from all the fair and goodly production of the garden. Happily the number is every day lessening. America is a young orchard, but when the planting of fruit trees in one of the newest states numbers nearly a quarter of a million in a single year, when there are more peaches exposed in the market of New York annually than are raised in all France; when American apples in large quantities command double price in European markets, in one part or another of the United States every man may literally sit under his own vine and fig-tree.

In the tropical zone amid the surprising luxuriance of vegetation of the great natural hot-house nature offers to man, almost without care, the most delicious and most nutritive fruits. The Plantain and Banana, excellent either raw or cooked, bearing all the year and producing upon a rood of ground the sustenance of a family. Also the nutritious bread fruit. Such are the natural fruit trees of those glowing climates.

Indolently seated under their shade and finding a refreshing coolness, both from their verdant canopy of leaves and their juicy fruits, it is not here that we must look for the patient and skilled cultivator. But in the temperate climates nature wears a harsher and sterner aspect. Plains bounded by rocky hills, visited not only by genial warmth and sunshine, but by cold winds and seasons of ice and snow. These are accompanied by sturdy forests whose outskirts are sprinkled with crabs and wild cherries and festooned with the clamboring branches of the wild grape. These native fruits which at first offer so little to the eye or palate are nevertheless types of our garden varieties. Destined in these climates to a perpetual struggle with nature, it is here that we find man improving and transforming her.

Transplanted into warmer aspect, stimulated by a richer soil, reared from selected seeds, carefully pruned, sheltered and watched, by slow degrees the sour and bitter Crabs expand to a golden Pippin; the wild pear loses its thorns, the dry, flavorless peach is at length a tempting and delicious fruit. It is thus only in the face of obstacles in a climate where nature is not prodigal of perfections and in the midst of thorns and slough that man, the gardener, arises and forces nature to yield to his art.

These improved sorts of fruits which man everywhere causes to share his civilization, bear, equally with himself, the impress of an existence removed from the natural state. When reared from seeds they always show a tendency to return to the wild form and it seems only chance when a new seedling is equal to or surpasses its parent. Removed from their natural form, these artificially created sorts are also much more liable to disease and to decay. From these facts arises the fruit garden with its various processes, of grafting, budding and other means of continuing the sorts.

W. E. Lilly, Chillicothe, Mo.

BEAUTIFYING A COUNTRY HOME.

We are all, more or less, influenced by the environments of the home. "Order is heavens highest law." Then the home should be made one of the dearest places on earth. Order must be established in the house and about the house. In the house is needed a touch here and there of ornament, such as fancy handiwork mingling with nice common-place pictures; window flower gardens in the dining room, a nice hanging-basket in the sitting-room; these composed of the winter blooming plants. After we have established good order in the house, we must call on the men for assistance. We want borders along the walks, beds to group annuals and herbaceous plants. Starting at the outline of the lawn we want to plant some forest trees, such as Carolina Poplar, Soft and Hard Maple, White and Cut-leafed Birch, Elm, and, a very pretty tree is the Sycamore. In the next space plant evergreens, such as Scotch and Austrian Pine, Norway Spruce and American Arbor Vitae, and closer to the house plant Irish Juniper, and Arbor Vitae Pyramidalis. Now we take another line through the lawn and on the outline, we plant Snowball, Lilac, Althea, Azalea, Calycanthus, Hydrangia, Tree Honeysuckle, Quince, (Cydonia), Spiraea, Syringa and Weigelia. Here and there we want some climbing plants, climbing roses, Wisteria, Clematis, and Honeysuckles. The hardy Hybrid perpetual and the June blooming roses may be grouped or clustered, but do not plant too thick. We must not forget the bulbous plants; these can be bedded at various points through the lawn. The selections can be made to suit the size and condition of the lawn Do what we can each season, until we have our ideal complete.

We must take into consideration the care and attention it will take in keeping such a lawn so as to be inviting, nice and beautiful. The home is where we live, and at home is where we want our children to stay, and here is where the first impressions are made on the minds of our children; and the first impressions on the child is the most lasting. Then should we not instil, into their minds, the highest, and most noble and most useful impressions that are in our power to reach? How astonishing it is when we come to know how few men and women there are who can not tell one tree from another; neither do they know the law by which the vegetable kingdom is governed and from which their own existence is supplied with food and raimant. Nature and nature's laws should be the text book of us all, as nature is the foundation of all temporal things.

MRS. S. H. LINTON, Marceline, Mo.

RANDOM TALK.

Ladies and Gentlemen:—First. As to the adaptation of our soil and climate to Horticultural pursuits no portion of the state is better suited to the business than Miller county and buyers from other localities have invariably praised our fruits, pronouncing them "very fine," or "the best they ever saw."

Second. Fruit growing pays. A friend of mine had a Ben Davis apple tree from which fifteen bushels were picked and sold under the tree for $5 last fall. At the long distance of thirty by thirty feet apart in the row one acre will hold fifty such trees and would yield the owner a net profit of $250; or, make the distance twenty feet apart each way, and you have one hundred and eight trees, and the crop is worth $540. I have helped to measure twice as many bushels from a single tree as the one alluded to. Will any other crop pay half as well?

Third. Without special allusion to the palatableness of good ripe fruit much is said now-a-days in regard to the medicinal properties of fruits. also in reference to their value as a food product.

The editor of "*Fruit*," published at Dunkirk, New York, propounded seven questions relative to these subjects, and elicited answers from Professors Craig, Jordan, Ward and Allen, and Doctors Richmond and Setland. While none advised an exclusive fruit diet, not one recommended a diet from which it should be omitted. Fresh, ripe fruits are said to be "excellent for purifying the blood and toning up the system."

Dr. Searles says: "The apple is an excellent brain food, because it has more Phosphoric acid in easily digested shape than other fruits." It is generally conceded that most fruits aid digestion, help the secretions and promote sound sleep. It is claimed that "in European countries, especially in Germany, the 'grape cure' has been reduced to a science and is resorted to as frequently as are the mineral springs in this country, with better results."

Fruit was once regarded as a luxury, but is now considered a necessity.

Fourth. But growers here have much to learn yet about picking, grading and packing fruit for market.

Fifth. We need still more practical knowledge concerning certain diseases and insect pests. Many of us know but little about the beetles that produce the "round" or "flat-headed" tree borers, or even the "larvae of the coddling moth," to say nothing about "peach yellows," or "San Jose scale."

Some tell us San Jose scale don't amount to much—that we talk too much about it—that Germany has taken advantage of our talk to legislate against American fruit, etc. But I believe we have just cause for alarm, since it has been discovered in several counties, and is performing its deadly work in our own state. Hence I am not quite ready to join Mr. Hale in exclaiming "Glory! glory! glory! blessed be San Jose scale." Our entomologist, Prof. J. M. Stedman, considers it "the worst insect pest of the orchard, and * * * capable of causing more damage to the fruit interests of the United States, or perhaps of the world, than any other known insect." Its presence, however, should stimulate us to better care of trees and orchards, and in our efforts to exterminate it we may rid our orchards of many other insects and diseases, and, ultimately, finer fruits and greater profits may be the result.

J. H. G. Jenkins, Spring Garden, Mo.

HORTICULTURAL EDUCATION.

REPORT OF THE SHAW BANQUET.

St. Louis, Mo., Nov. 10.

This evening was so well spent in the discussion of this important matter that I feel it well worth place in our report.

L. A. Goodman, Secretary.

Dr. Trelease called the guests to order at about 9:30 P. M., at Mercantile Club Rooms and among other things said:

"Some of you know and to others I will say, that by the provisions of Mr. Shaw's will, the director of the Garden is required to preside over these banquets.

Instead of my calling on the speakers, I have arranged to give this pleasant task to a gentleman who is well known to most, if not all, of you as an educator, as the Dean of an important School of Engineering and as President of the Academy of Science of St. Louis, and who, at the same time, is a member of the Board of Trustees of the Missouri Botanical Garden. I, therefore, have the pleasure of introducing to you, as your chairman, Prof. Edmond A. Engler, of Washington University."

Prof. Engler said:—"Gentlemen, Dr. Trelease has informed you how it happens that I am called upon to preside over you this evening.

"We have with us this evening Mr. W. N. Rudd of Chicago, the president elect of the Society of American Florists, who has jnst finished presiding over a very successful Crysanthemum show in the city of Chicago. Surely, no one is better fitted to speak to us about flowers than he. I will simply ask him what a flower is to him? What it is to the Society of American Florists! What it is to the great American people? I have the pleasure of introducing to you Mr. Rudd of Chicago."

Mr. Rudd inresponse said:—"You ask me what a flower means to the Society of American Florists? That is rather a difficult question, perhaps, to answer, because the Society of American Florists is such a great body. It is made up of men from Maine to California, and from Minnesota to the southern limits of the United States—men of all kinds, men who grow flowers for the love of them; men who grow flowers through the worship of the 'almighty dollar;' men who study flowers to note their methods of growth in order that they may be known to their fellow men, and that they may discover all the wonderful secrets pertaining to the life of the flowers. We have ministers and professional men of all kinds in the Society of American Florists, and I presume that a flower means something different to every one of them; but it means to all of us the most beautiful thing that the Almighty ever made. I do not think that any amount of familiarity with flowers will take away from us that sense of the wonderful beauty of them.

Prof. Engler:—"Within the memory of all of us, great changes have taken place in our ideas in reference to what was necessary for the education of children; and various subjects which our fathers and grand fathers knew nothing of have been introduced into the curricula of our schools. We are beginning to teach the girls how to cook. We are teaching the boys manual training. We are begining to introduce into the elementary schools various branches of science, and even the study of psychology has come in for a portion of our attention.

"We have with us this evening a gentleman who has an idea that it would be a good thing to introduce the study of Horticulture into the public schools. I think he will probably be ready to show that whatever else may be good, Horticulture is better; that whatever else may be proper for a child to learn, Horticulture is indispensable. I have great pleasure in introducing to you Mr. G. B. Lamm, a prominent Horticulturist of this state."

Mr. Lamm said:—"We have just reasons for being plain and humble before all men when we present to them our argument in favor of teaching Horticulture in our Public Schools. We do this in order to be able to call men away from the selfish commercial fields in which the most of us, in this age, are so inclined to linger, and to woo them into a less rarely cultivated field—the field of justice, of patriotism, of philanthropy, of art, of science, of culture and blessing to all men.

"I wish that the generous Henry Shaw were here to-night to speak upon this subject. He would tell you to lay aside politics and denominationalism and commercialism which kindle strife, separate and misdirect their energies in life; and he would ask you to enter again the ranks of the patriots, the scientists and the benefactors of mankind. He would tell us in his substantial way that to live for those we love and to love those with whom we live, is true life and royal heroism. He would say, fit the earth for the living and the living for the earth.

"Practical Horticulture includes the study of flowers, seeds, nuts, fruits, vegetables, weeds, grasses and shrubs, as well as the gigantic Eucalyptus of the forest. It has to do in a measure with fungus growths, insects, birds and animals—all of which afford an inviting field of information to our bright, restless and ambitious youth.

The study of Horticulture introduces the science of practical Chemistry; it correlates with the study of Physical and Descriptive Geography; it opens the way for Botany, Zoology and Geology; and above all, it will acquaint the child with what it most delights of all to know, viz, how to deal with the world in which it lives and which supplies its own wants. The study of Horticulture also develops the power of observation and the retentive and reasoning faculties of the mind.

"And now, I stand here in the name of the Missouri State Horticultural Society, in the name of the 981,000 school children of Missouri, in the name of her 15,000 noble teachers, and at the very threshold of that beautiful botanical garden—the gateway by which we are to enter into the new age of education—and I plead with you gentlemen for your sympathy and your influence in this deserving cause. I stand here almost in the presence of the ashes of our noble hero, Henry Shaw, and look out upon our multiplied thousands of poorly ornamented home grounds and school grounds and upon the illy educated and fed children of our rural districts, and state that it is our duty to try to free our children from the dead theories of a dead past and open up to them the knowledge of more practical things.

Toastmaster Engler:—"We are glad to hear one who believes what he says, and who presents his subject with such force as Mr. Lamm has done. His remarks come with special significance because he himself is a teacher. But when we propose to introduce the study of Horticulture into our public schools, the question arises, 'May it not interfere with something else? Horticulture is all right, but must we sacrifice something else?' Those of us who deal with education in its higher forms are continually noticing one striking fact, which, perhaps, is becoming more and more prominent year by year. We observe that the students have the elements of a number of natural sciences; we observe, for example, that they can give you the technical names and processes and divisions of subjects and classifications of subjects but they can not spell. We observe that they well know how to sketch roughly the form of some of the most intricate divisions of structural anatomy, whether it be of plant or animal, but they can not write.

"Now, if there is any essential antagonism between these elementary studies and the studies which, under the new order of things, we are introducing into our public schools, among which is the study of Horticulture, I would like to ask Dr. F. Louis Soldan, superintendent of our St. Louis public school system, to explain to us why it is so, if it is so; and if it is so, how it can be remedied."

Dr. Soldan said:—"As to the importance of instruction in Horticulture, the importance of instruction in plant life,—there is no step in life, there is no possible surroundings in which we find our selves, where the importance of some knowledge of plants and plant products does not impress itself upon us.

"There was a time when little instruction in nature study was presented to the children in the public and private schools, but that time has passed. For many years some of the best work ever done in education in the direction of nature study has been done in this country, in our public schools; and it would be wrong for me not to mention that the one who enabled one of the largest systems of public schools we have, to do the best work in the study of plants and nature that was ever done anywhere, in Europe or here, is Prof. Jackman, of Chicago, who is present. In our own schools we are still at the beginning of that important work, but we have made a beginning. In the very lowest schools in the kindergarten, the children are surrounded by plants; they become acquainted with animal life. Plants in the windows are observed as they are being planted and as they grow. Their form and their kind are noticed. The elements of insect life and their relations to the plant are studied. In the schools there is at least one hour every week in every one of the public schools of the city in which the leading ideas of plant life are presented to the children, and form a fixed part of the course of study.

"But there are two things which we try to emphasize. First the importance of plants for man's life. No lesson in Geography, no lesson in regard to man, and the distribution of men in the world, which leads to the highest civilization by furnishing conditions for the same, can be studied without some idea of plant life and the influence of plants and flowers on that civilization.

"There is a second direction in which this study proceeds. Referring to a remark made some time ago, I am reminded of one of Beecher's beautiful sayings, 'The sweetest thing,' he says, 'that God ever created and forgot to put a soul into, is a flower.'

"Children are easily influenced by anything that comes to them in the form of beauty. Take a flower and make them study it, and it, in itself, is an education. Their drawing lessons are based largely on the study of flowers so as to make the idea of beauty more familiar, and so as to develop the sense of beauty, and that, in itself, is the beginning of education. I hope to see good books published on the subject of Horticulture; but I should dread to see the study of plants and the study of flowers confined to books exclusively, and not take in nature herself.

"Here is a great problem for us to study in the matter of education. Here is a great difficulty which needs leadership in all these matters pertaining to the course of study in nature to prevent it from drifting into a mere literary study but bring it back again and again to the study of nature herself. I could talk upon the subject, Mr. Chairman and gentleman, beyond the measure of time allotted to me, but I wish to point out a farther direction in which nature study in the public schools tends. With a small number of plants or a smaller number of flowers, may be taught these lessons; but the most familar things in nature should be made as familiar to the little child that has passed through your public schools as it is to the scholar. They should find in nature, friends whom they will know. There is so much information about a plant without knowing its name,—the laws according to which it grows, the wonderful adjustment of its parts to its surroundings,—that offers a lesson worthy of the best scholar, and worthy to be placed among the best subjects. The study of flowers will open a new world of paradise to childhood. I will conclude this short address with the beautiful thought, which, I believe, Gray expressed, in which he tells of the fact that you make the life of the child happier and more like life in Paradise if you introduce him to a sympathetic study of nature:

> "The meanest floweret in the vale,
> The smallest note that swells the gale,
> The common sun, the air, the skies,
> To him they open Paradise."

Prof. Engler:—"It has been claimed that all development is the result of stern necessity. It has even been questioned whether man would ever have learned anything if he had not been compelled to. If this view of the increase of knowledge is correct, it may be interesting for us to hear to what extent there is need for the study of horticulture in our common schools, and to what extent that need is felt in the state of Missouri.

"I take pleasure, therefore, in calling upon Mr. L. A. Goodman, secretary of the Missouri State Horticultural Society."

Mr. Goodman said—:"Teaching requires teachers; teachers who know something of nature, and who know the difference between a maple and a sweet gum; who know the difference between a daisy and a sun-flower; who know the difference between an apple and a pear tree, the difference between an elm and an oak. We must have teachers who know how to teach, who love to teach. For seventeen years it has been my pleasure and my province to visit a great many of the schools of the State, and to talk with the teachers and to try and bring before them clearly this thought of knowing how to teach something of nature. But to my utter amazement I have gone a way from many of these schools thoroughly dispirited and thoroughly mortified to think really how little they did know about the study of nature. The child should be taught how to think. Nature is better than books, for books contain mere theories.

"Teach a child how to think correctly, and as a result of correct thought, correct action will come. Teaching the child to think correctly is particularly the teacher's work. Teaching a child how to see, and how to draw conclusions from what he sees. Doubtless you have known people in passing through a country, who seem never to see it, and draw no conclusions from what is passing before them. Telling a child something is not teaching. Many of our teachers in our public schools seem to think they are teaching because they are telling their pupils. As the president of our school board for fifteen years, it was my care in meeting teachers to impress upon their minds the idea that they should teach the child as well as tell it. That is what brings results. One who teaches should love the work and feel an interest in nature. Such an one should see poems in trees, wisdom in lilies, and feel the grandeur of a landscape and its surroundings; see pleasure in gardens, happiness in flowers, health in fruits and wealth in them all.

And further the child should be taught to see just as much and to observe the methods and workings of nature as well as her external beauties, so that in later years his work in the garden and orchard shall be done scientifically, based upon the facts he has already learned. Then shall horticulture be a science and it is such horticulture we are needing. There must be practical application of the principles he is learning; for it is what the pupil does, not what the teacher does, that will bring him the wisdom that will be valuable to him.

How shall teachers teach horticulture in the public school without preparation? How shall they prepare without direction? How shall they be directed without opportunity for study and how shall they study without a love for the work? This love will secure the knowledge and give the inspiration for imparting it to others. Our teachers should study nature more, but books none the less. Our Colleges, Normal Schools, Universities and Agricultural Colleges and our State Society should be the first to arouse and encourage interest and help prepare teachers. But it seems to me that the most profitable place for continuing the nature study, begun in the ward school, is the Manual Training School. There can be given a deeper comprehension and a practical application of the principles of seed growth, root and leaf feeding, bud formation and the maturing of the fruit.

Young people should be taught the use of a microscope and how to see. There is so much to see and know in trees, flowers and plants, how to distinguish beteween varieties, how the seeds start and grow. This is easily shown in the school room. Neither is the propagation of flowers and plants much trouble to illustrate, nor the use and arrangement of trees, vines and shrubs in the yard.

Then time for such lessons is never scarce, besides having regular periods in schools as for mathematics, there is the recreation time which may be restfully utilized for such work. And whenever we are riding or walking from work or play there are innumerable opportunities for observation which is so much the more profitable as it is more systematically irected along various lines.

Place for this study is still more abundant than time, every field and piece of woods in park and forest, every hill and stream with their rocks and pebbles, bearing lichens, ferns and mosses. Even in the city there are the possibilities of window and housetop, of market and street.

Lately there are so many books that present the deepest facts and lessons of nature in a way fascinating to the simple as well as to the learned mind. Some are charming stories, as: A Kentucky Cardinal, by James Lane Allen, At You All's House, by Jas. Newton Baskett, others more directly instructive as Miss Meriam's on Bird Life, F. Schuyler Mathews on Flowers and Trees, or those dealing, more generally with numerous sides of nature life as Fresh Fields, Indoor Studies and Wake Robin by John Burroughs, who while writing in the same vein has a brighter spirit than the great Thoreau telling of the events and customs in his world of plants and animals.

Memory work is good, but observation is better, and teachers already cognizant of this are asking for specimens of fruits, nuts, grains, grasses, woods, leaves, twigs, buds and flowers. Teach the child how to observe the processes of nature. Take him into the orchard and let him learn how to pick the fruit, how it ripens and how to handle it nicely. Teach him to observe and know insect life, bird life, vegetable diseases, all the mysteries of nature's workings and there will be no question raised about these other things that we want taught in our public schools.

The newer plans of education already starting out on these lines are better than the old narrower ones. Take all the higher education you can get, none is too good, not however leaving out the lesser. Study sunshine, atmosphere, soil, moisture. What a revelation of wonders and mysteries is found in that most beautiful of all sciences, Botany. The study of the relationship between order, genus, species; of seeds, tubers, cuttings, bulbs; of the root, stem, twig, leaf, bud, blossom, fruit; of the parts of the flower, calix, corolla, sepals, petals, stamens, pistils, ovaries. It is not necessary to follow this further, nor to touch on the sister sciences of Entomology, Geology or Chemistry. Are not all these books marvelous, living books?

But to the practical application of all this knowledge in horticultural work, for the value is but meagre until it is so used as to bring about a definite and desired result. All labor is lightened when we have some plan in mind to work out. So let the children, now grown, apply accurately these principles to landscape gardening, to nursery work, to floriculture in greenhouse, yard and home to the vineyards and the orchards, in varieties, in planting, cultivation, pruning, gathering and packing.

The field opens up broad when we inquire into it. Horticulture embraces all these practical questions. In all this study then, of nature in all her branches, we plead for Horticulture to have her just share.

Prof. Engler:—"Nature never did betray the heart that loved her." "I quote these words as a fitting introduction to a speech which we will have from our friend, Prof. W. S. Jackman, who is a teacher of teachers, and whose book on nature study in our common schools is so well known as to have made him famous. I have the pleasure of introducing Prof. Jackman, of Chicago."

Professor Jackman responded as follows:

"*Mr. Chairman and Gentlemen:*—The privileges and opportunities of this occasions are, in my esteem, so sacred that I regret most deeply that I am called upon to speak with almost no preparation whatever. I have been impressed, however, by listening this evening, with the great importance of this work, and with a wonderful reverence and love which is needed by me and my fellow teachers in our efforts to bring our children face to face with nature.

."I have been pondering all the evening, as I have pondered before, upon one of the questions produced here. What do these flowers mean to the children, especially in the cities?

I could relate a number of instances which would throw a flood of light upon the lives and experiences of those children, and one of these touched me so deeply that I beg leave to repeat it.

"We took the children south of the city on one of these occasions, and went with them to a distance possibly of 15 or 20 miles from the center of the city, and turned them loose. We did not pretend to do much watching. We could not do much teaching, the children were so new to nature, and so fresh that we simply turned them loose and let them drink their fill.' The superintendent of the class called my attention to one little boy. He was a little ragamuffin, sitting under the spreading branches of a great oak on the banks of the Des Plaines Valley, overlooking a landscape of flowers and of waving grain. He seemed absorbed in the prospect, and when the superintendent came up to him he turned his face, all radiant with joy, and said, 'Is dis pretty ting all ours? Is dis all in the United States?' His boundaries of the United States up to that time had been confined "within the alleys and narrow streets of his quarter of the city. It seemed to me that out of that prospect, and out of that experience, almost anything might grow. It seemed to me that out of that childs feelings thus acted upon, the spirit of patriotism and love of country might follow. I believe if we are to teach patriotism to our children, we have got to let our children see the country first.

"The intimation has been thrown out here to-night that perhaps the child's study of nature might interfere with something else in the schools. I can assure such objectors that it will interfere with some of the things they are taught. It will interfere with some of the dull routine that you and I can recollect, which we passed through when we were in these schools. The children have waited all too long for such an interference. And then these people I speak of who are talking about the higher walks of education did not learn their nature from the Botanical Garden that they have in this city. They got it by books, or, perhaps, not at all.

"I think the most practical thing would be for the horticulturist to go home and change place with the school teacher for a while. The children would learn something of Horticulture, and perhaps, also, you would learn something of school teaching.

"It is quite important, gentlemen, to do those things you believe in. You believe in this, or you would not say so. Let us as Horticulturists and teachers meet together more frequently in gatherings of this character, and exchange experiences, and learn what we can from one another, and then go into the school room and shape the work in that direction.

Toastmaster Engler:—"The last speaker has referred to the difficulty of directing city children to a proper appreciation of the beauties of nature because of the fact that it is necessarily to take them into the country. That remark suggests to me another one of the difficulties towards which civilized nations are now tending, particularly the older nations, and that is the fact of drawing the population from the rural districts to the great cities. We are beginning to feel it in this country, and they are feeling it to a greater extent in England, in Germany and in France.

"Now, one of the effects of the introduction of the study of Horticulture into our common schools must be to make the farmer more intelligent and to add to his enjoyment of life and broaden his sphere of existence. I will call on Mr. Levi Chubbuck, the editor of *Coleman's Rural World*, who is well known to us all, to speak to us as to the effect of this study on the children of the country."

Mr. Chubbuck said:—"Mr. Chairman and gentleman:—We Americans have a pretty good right, on the whole, to a pretty good opinion of ourselves. We think very highly of our public school system. It has done wonders in this country, and I am especially pleased to hear the strong words that have been uttered here to-night by men who are connected so intimately as Prof. Soldan and Prof. Jackman are with the work of these schools. I am glad to know that they and other leading educators are giving earnest attention to this matter of nature study in our public schools. There are reasons, however, for not concluding that we, in this country, are not altogether in advance of other countries in this respect. Our chairman has referred to what is going on in some European countries in this particular. The remark has called to mind a little incident. A group of men were talking in connection with another line of work somewhat different from that under discussion during this evening, and yet related to it. They were dairymen. One of the group had the reputation of being quite a scholarly man. In discussing how to take care of their cows this man had advised that they ought to keep their stables warm in winter, saying: "It is always well to remember on the feed question that 'food is fuel.'" One of the men, a Yankee farmer, who thought he was pretty well up, looked rather skeptically and said: "Yes, I've read that, and, maybe, there is something in it, but I guess not much. Give a cow all she wants to eat and she will give milk the same in a barn full of cracks as in a tight one. I guess that food and fuel talk comes from some of your professors, don't it?" Next to him stood a neighbor, a German, who had been a hired man for years, and is now a prosperous farmer. He spoke up and said: "Vell if you dink a cow give yoost so much milk in a cold barn as in a warm one, you make a bad humbug on yourself. In Germany we learn all dot in der schule (school). Vy you not learn someding too?" They have been learning these facts in Germany in the schools; they are learning them in England and they are learning them in France; and the result is, in England the yield of wheat is thirty or more bushels to the acre, and in France it is still greater, while in this country, notwithstanding the natural fertility of our soils, the yield is, on an average, only about twelve bushels per acre.

"My friends, you have been talking here about the teaching of Horticulture in the public schools. The last speaker on the floor urged that when you went home you work out these problems practically. I want to make a suggestion along that line. Do not take a selfish position in this matter. Remember that Horticulture is only a part of the one great subject of Agriculture. The same facts which underlie the production of the rose, underlie the production of a pound of butter. It is a broad subject, and is not confined to a single line. We should take a wide view and try to carry into the schools the underlying principles of Agriculture, not merely the study of Horticulture—though Horticulture in itself is a grand subject, beautiful subject—but it is not all. Let it be Nature Study. You in prosecuting this idea of Horticulture in the public schools, can be patriotic, as was urged, by considering the educational needs of the whole class of which you are a part. I wish I could utter all that is in my heart along this line. It is a wonderful subject, and you have listened to some very pertinent, interesting and practical talks in regard to it. I wish Godspeed to this idea of Nature Study in our public schools."

Prof. Engler:—"We are all agreed that Nature Study in all its forms tends to educate the child in many of the virtues to which the ordinary studies do not tend to educate it. I will call, therefore, upon Hon. John R. Kirk, superintendent of schools of the state of Missouri, to tell us in what condition the schools are now with respect to this point, that of introducing Horticulture into their curricula.

Superintendent Kirk made a fervid and stirring response. He said in part: "It is my firm conviction that a large part of what we now call 'Geography' should be elimenated from the school curriculum. Much of it is so worthless or misleading as to retard education and exhaust the children's energies without any definite purpose. What is true geographically to-day may not be true to-morrow, and probably was not true five years ago. All teachers in elementary schools should know the elements of science from the laboratory view point. By this, I mean they should be able to give instruction in the elements of Agriculture, which I understand to include horticulture also. Forty or fifty Missouri high schools teach Biology and Botany well; yet little headway has been made in teaching Agriculture as such. The State University is equipped for teaching these and kindred subjects, and the people have only to demand practical education in the common schools. The demand will be promptly met.

Children should learn about the country they live in rather than the remote regions of Asia and the Arctic Zone. They should know the vegetable and animal life about them, the rocks and the soils and how soils are produced, wasted and restored. To the lovers of art and classics and all literature, let me say that practical science in the form of elementary Agriculture and Horticulture in the schools does not mean any less of classics or any less of other higher learning; it means a foundation for broader, better and more purposeful existence; it means the culture of the senses, the formation of clean cut ideals and the creation of definite purposes so that the higher learning may have inestimably greater value; it means greater motive power, more certain initiative and a far better appreciation of the things which extend beyond the world of sense. We must adorn the walls of our school rooms with works of art and surround the buildings with shade trees, lawns, flower beds and school gardens, where the children can learn to work intelligently, where wholesome sentiments may become deep seated, and where right conceptions of truth and duty may receive a daily stimulus."

Prof. Engler:—"We are much indebted to the speakers of the evening for their remarks upon the subject which has given such satisfaction to all of us. It is only to be hoped, as some of the speakers have suggested, that the ideas that have been put forth here to-night shaped into words, shall be put into acts, that we may see the results of the discussion which we have held at this meeting in some practical form, and do what we have been talking about as so desirable here to-night.

MISCELLANEOUS PAPERS.

MISCELLANEOUS PAPERS.

APPLE.

GRAFTING APPLE TREES.

Probably no topic connected with apple growing has received more discussion than the methods of grafting, the most divers opinions being held by nurserymen and apple growers. The Kansas Station has recently reported experiments in which some important points in regard to root grafting apples were brought out. The object of the work was to determine the relative merits of various lengths of stock and scion, and of various positions of the graft on the stock. The tests were carried through a number of years and in all, several thousand grafts were made. The stocks used were all No. 1 seedlings, most of which were regraded to get a uniform lot. The scions were also as uniform as possible.

In the first experiment six inch Ben Davis scions were grafted on different parts of roots. The tops of seedlings were cut off below the crown and the roots cut into three pieces. One hundred grafts were made with the upper parts of the roots, one hundred with the middle parts, and one hundred with the lower parts or tips of the roots. About eighty per cent of the grafts made with the upper and middle parts of the roots grew, and at one and two years old there was little difference between the trees grown from them. Of the grafts made with the root tips only sixty per cent grew. The first season the trees of this lot averaged one third less in height than the other lots and were more slender and weak. The second year the difference was less marked. The same year that the above experiment was begun one hundred Ben Davis scions two feet long were grafted on the upper parts of roots cut below the crown. At two years old these trees were about one half larger and stronger than the trees from six inch scions on similar stocks. Many of the tops were so heavy as to necessitate summer pruning.

In 1893 more extensive experiments were made. Wine Sap, Missouri Pippin, Ben Davis and Maiden Blush apples were used in each series of grafts made. Three lengths of scions, six, twelve and twenty-four inches were used. With each kind of scion four lengths of stocks were used, namely, piece roots, one and one fourth, two and one half and five inches long, and whole roots. For all piece root grafts, the upper parts of roots were used. In all cases except where one and one fourth inch stocks were used, one half of the grafts were made one inch above the crown and the other half below the crown. Beside the above, a number of grafts were made on two and one half inch piece roots of small size. In all, nine thousand two hundred grafts were made. The grafts were set in nursery rows, with the place of union of stock and scion in all cases about three inches below the surface of the soil. The percentage of loss was great, owing to the very unfavorable spring and to the grafts having been stored in a cellar which was too warm. The loss with the whole root grafts was least and increased as the length of root diminished. About eighty two per cent of the whole root grafts were living at the end of the first year, as against only about forty-nine per cent of the five inch, seventeen per cent of the two and one half inch, eleven per cent of the small two and one half inch and six per cent of the one and one fourth inch piece root grafts. From measurements made at the end of the third season it was shown that the greatest growth was made in trees grafted on the longest stocks and that the growth declined gradually, though slightly, with the shorter stocks, being about eleven per cent greater with the whole root than with the one and one fourth inch piece root grafts. The trees also showed a tendency to make the best growth from the longest scions, the growth being eleven per cent greater with the twenty-four inch scions than with the six inch ones. There was no constant difference in growth between the trees grafted above the crown and those grafted below it.

In eighteen and ninety-five, grafts were made with twelve and six inch scions on whole roots, five inch roots and two and one half inch roots, grafted above and below the crown. In addition, a stock grafted above the crown, with roots cut eight inches long, was tested. After two years' growth no constant differences were shown in favor of either length or style of stock or of grafting either above or below the crown. The trees from twelve inch scions were invariably greater in height and diameter than those from six inch scions.

An experiment in root grafting was made by F. Wellhouse, president of the Kansas Horticultural Society. About four hundred trees each of Wine Sap, Ben Davis and Missouri Pippin apples, grafted on whole root stocks, were set in the orchard together with trees grafted on two inch piece root stocks. During nineteen years no difference in growth, vigor or fruitfulness was observed between them, except that for the first six or eight years the whole roots threw up from their roots more water sprouts than the piece root trees.

These tests show that there are fairly uniform differences in the first few years' growth of trees in favor of the longer scions and stocks, but by the end of the third years' growth the differences largely disappear, and that there is no constant difference between trees grafted above and those grafted below the crown.

Besides the observations on the height and diameter of trees, the Kansas Station has also reported a study of the root development of grafted trees. It was found that the main root growth of the first year from all lengths of stock was made at or just below the union of the stock and scion, and that the growth at this point became more pronounced in the second and third years. The growth from the lower portion of the stock was very slight during the first year, and became of even less importance during the second and third years; the growth from the lower part of the stock was greatest in case of the shorter piece roots and least in case of the whole roots. With grafts that were buried deeply, a new system of side roots formed at about the usual depth below the surface of the soil, to the more or less complete dwarfing of the lower and earlier root system.

All these experiments go to show that the use of long scions and stocks may be of some little advantage to nurserymen in inducing a better growth of trees during the first two or three years. The long scions and stocks are, however, considerably more expensive than the shorter ones. Planting whole root grafts is much more laborious than planting short piece root grafts. In reporting these experiments the authors say that the difference in growth in favor of the longer scions and stocks is probably not sufficient to repay the extra expense made necessary by their use.

For the fruit grower, at least in the locality of the Kansas Station, the longer stocks appear to have no advantage over the shorter ones, since trees produced from them make no greater growth than trees from the shorter stocks except in the first few years. The fact that the greater part of the root growth is made from the upper parts of the stocks is evidence that the long stocks serve very little purpose. The production of roots from the scion, as occurred when short piece roots were used, is in many cases a direct advantage, since seedling stocks are very variable in hardiness and vigor of growth. Under conditions at the Kansas Station, piece roots from two to five inches long are thought to give the best results, all things considered.—Farmers' Bulletin No. 79, of U. S. Department of Agriculture.

PRINCIPLES OF PRUNING.

Pruning is an operation of vast importance in the management of trees, and the principles upon which it is founded must be clearly understood before complete success in fruit culture can be attained.

Plants left to nature maintain a well-balanced reciprocal action between their branches and roots; and every branch, bud or leaf that is removed must exercise an influence either injurious or beneficial, and no one should attempt to remove branches unless they foresee the effects and influence of such removals.

The time of pruning, whether during the summer or during winter, will depend upon the object to be attained; a brief consideration of plant growth will assist us in determining this question.

When a seed is deposited in a suitable germinating medium its first effort is to send a root downwards in the earth, and then push a shoot upwards in the air. The seed contains within itself all the nutriment necessary for this process; but as soon as the young plant is so far formed, its mode of existence is changed, and it becomes dependent upon the soil and atmosphere for future support.

The elementary substances absorbed by the roots undergo decomposition through the influence of the leaves, and the material is thus prepared for further root growth and extension. The roots have no inherent power of extension, but are dependent upon the health and action of the foliage; and although in germination the roots are first formed, their growth is due to the action of the foliage of the plant that produced the seed from which they emitted.

It is, therefore, apparent that the increase in size of the plant, the quality and quantity of its secretions, and the extension of its roots are all dependent upon the healthy action of the leaves.

When it is considered how essential the foliage is to the healthy development of the plant, we may as well pause before infringing upon the reciprocal action nature has established between the roots and branches, for it is evident that every branch or leaf removed has an effect for good or for evil upon the plant. The correlative action between the leaves and roots being so intimately connected, it follows that any diminution of leaf growth during the period of active vegetation must retard root development. Hence it is an axiom, now becoming recognized, that summer pruning weakens growth, while winter pruning produces a contrary effect.

Summer pruning can be useful where wood-growth is to be checked, and it will be repressed in proportion to the severity of the removal of the foliage. Fruit trees, when planted in a generous soil, frequently attain a luxuriance incompatible with a fruitful habit, and their flowering may be somewhat hastened by judicious pruning or pinching, so as to retard wood-growth; but care must be exercised, and much observation and experience are requisite before the object can be safely attained.

Winter pruning invigorates wood-growth. When a portion of the branches of a tree is removed after the fall of the leaves, the balance of growth is destroyed and the roots have the preponderance; the remaining buds will now shoot forth with increased vigor—an important consideration with trees or vines that have become weakened from over-bearing or any other cause, imparting new vigor to weak and sickly plants.

When the size of a tree is the only object sought, summer pruning should not be practiced. But it may be said that pruning of any kind is a negative operation, and probably it is within the limits of possibility that trees may be trained to any form and maintained in a fruitful condition without any instrumental pruning whatever, unless to remedy disease and casualties. It is much easier, for instance, to rub of a bud in May than it is to cut out a branch in December; and if a judicious system of disbudding and pinching was strictly followed there would be no occasion for winter pruning; or, were it possible to place a tree in such a soil, and under such conditions that it would only make a moderate growth of well-matured wood, little, if any, pruning would be required. But as all of these conditions are difficult to realize in happy combination, we have to resort to pruning, and a knowledge of the principles involved will materially assist the operator.—*Southwest.*

WINTER CARE OF APPLE TREES.

Editors Country Gentleman:—The apple orchards of our farms are all important because we have them, but many of them are not as profitable as other crops because they do not receive proper attention. They are not cultivated in the sense that corn and potatoes are cultivated. Why is it so? Much money and time are expended to grow the trees, valuable land is devoted to them, and through carelessness the whole is at least two thirds lost.

We know that land occupied by any one crop season after season for many years, will become for that crop, "land-sick" and unproductive. This may not be true of carrots, onions and grasses, but it is true, generally speaking. Grassland, even, will not remain healthy and productive unless cultivated by mowing, pasturing, fertilizing and harrow-working, with reseeding. Agitation by the hoof of animals is cultivation, and renews vigor; mowing does the same and imparts new life, if such work is done before the seed matures. The orchard does not provide self cultivation. In neglected orchards the bark becomes dull and lifeless, a limb cut or broken off leaves a dead stump, and decay ultimately recedes with blighting effect into the heart of the tree. Many hundreds of little suckers fill its body, and thereafter such trees will not produce clean or full-sized fruit. Such results are the direct effect of neglect, either from want of knowledge or attention. Orchards of this class may be resuscitated and made profitable by the application of the pruning knife and scraper at this season, and other care later on.

One growing season's management of an old orchard is worth separate and special attention, particularly when such management will produce results beneficial to the orchard and profitable to the owner. But put the above work in hand at once. D. E. HOWATT.

CUTTING AND KEEPING SCIONS.

Scions of fruit trees may be .cut any time after the leaves fall, and many think the earlier the better, as if cut before there is very hard freezing there can be no danger of injury from the intense cold that may occur. But all such work should be done when the temperature is above the freezing point. And the scions as soon as cut should be protected from drying out. Where there are only a few scions they can be kept perfectly by covering in slightly damp earth in the cellar, or some place in the garden where water will not lie on the surface. In larger quantities they would require to be packed in a box, with some material that would retain moisture and yet not be too damp. Moss— "sphagnum"—just as it is found on fallen timber in the woods, answers well, but requires frequent watching on account of its being inclined to dry out. Sawdust, as it comes from the log, does better, holding moisture longer; but it, also, needs to be looked after. Dead leaves from the woods, first recommended we believe, by Professor Budd, of the Iowa Agricultural College, answers a good purpose if used plentifully on all sides between the scions and the box, and partly among the scions. And it may be added that the larger the lot of scions kept together the better they keep; and it will also be found in packing with leaves that the less they are distributed the less they will be inclined to dry out. But a little shriveling will not hurt them, and better this than to be kept too damp. When kept too damp and eight or ten degrees above the freezing point, a process analagous to the formation of callus in cuttings goes on in the scions and injures them for grafting very much. About the only difficulty connected with keeping scions in the ground is that the earth, which adheres more or less to them, quickly dulls the edge of the knife in grafting; a serious drawback when there is much work of the kind to be done.—*Prairie Farmer.*

RENEWING OLD TREES.

Old trees are the most cherished treasures of rural and suburban homes, says the *Boston Transcript.* They are the most costly, too, as every finished product is costly into which has entered those transforming and creative processes, which only long reaches of time can furnish. A recent number of *Garden and Forest* discusses the rejuvenescence of old trees, and give practical directions for effecting it. Directly to the point are two illustrations of the same tree, a venerable oak in the Arnold arboretum. The first is of a tree with far-reaching branches, but marked by infallible signs of decrepitude, the leafage scanty and the general prospect of life discouraging.

The second illustration shows the same tree twelve years later, shorter of limb, it is true, but displaying vigor in every leaf any fiber, and exhibiting every characteristic of youth and strength and hopeful promise of longevity. No miracle, not even one of nature's, has been performed. The result is simply one of skillful tree surgery of intelligent pruning according to the DeCar's system which, instead of sending the tree blood long distances through collapsed and withered arteries, contracts the area and applies the nourishing forces in such a way that they can be assimilated and made to promote the growth of all the members. The process is one which almost any intelligent farmer or tree owner should be able to apply. "Vigor can be restored to a tree in this condition by shortening all its branches by one third or one half their entire length. The only care needed in this operation is to cut back each main branch to a healthy lateral branch, which will serve to attract and elaborate by means of its leaves a sufficient flow of sap to insure the growth of the branch." These directions must be carefully observed to prevent further decay, and care must also be taken to leave the lowest limbs the longest, so that the greatest possible leaf surface shall be exposed to the light. So if some old tree near roadside or dwelling, that has been the landmark of a century, shows alarming symptoms, the owner should not despair before he has treated it according to the general plan here laid down.—*Colman's Rural World.*

FALL PLANTING OF TREES.

In a bulletin just issued by the Nebraska Experiment Station, Prof. Fred W. Card has given the results of some careful experiments, which have been carried on for several years by that Station to determine the best methods of tree-planting. We reprint in full in this issue as follows:

One of the chief arguments for fall planting is that the tree may become established in its position and make some root growth before the ground freezes and before leaf-growth can begin in spring.

The question occurs as to how much, if any, growth can take place, since plant food must be elaborated by the leaves, and if there are no leaves new growth must be at the expense of food stored up in the tree. In order to gain light upon this question apple and peach trees were planted October 22, 1897. November 16, two trees of each variety were dug up and examined. On most of these trees no evidence of root growth could be found, though on two or three of the apple trees new tips had formed, usually as branches from the fibrous rootlets. They were not numerous and were very small, not over one eighth to one fourth of an inch in length. None were found on the peach trees. The trees had been planted in well cultivated garden land, free from weeds, and good rains had fallen, so that the soil conditions were excellent, much better than they usually would be in Nebraska.

April 8, 1898, an apple tree, two or three years planted, was taken up and examined. The buds were then perfectly dormant, the spring having been cold and backward. Root growth was unmistakably progressing and apparently with considerable rapidity, although such a mass of fibrous roots existed that it was not easy to detect those which had just developed.

On the same day additional trees from those planted on October 22 were taken up and examined. Root growth was progressing well in most cases, and callousing was also under way. The amount of growth was not large, but sufficient to fully demonstrate the fact that trees can make a growth of roots when the tops are dormant.

At that date the buds had not begun to swell and the trees were apparently as completely dormant as during the winter. In general the apple trees appeared to be making more root growth than the peach trees. There had apparently been no callousing during the fall and winter, there being little indication of it in most cases even at that time. Where apparent, it seemed to be just beginning at the cambium ring.

Through the kindness of Dr. William Trelease, the Missouri Botanical Garden co-operated with us in seeking light upon this question. The experiments were in charge of H. C. Irish, the Horticultural assistant, who makes the following report:

"November 3, 1897, four trees of each of the following varieties of apples were received from a St. Louis nursery: Ben Davis, Winesap, Oldenberg, Chenango and Shackelford, also three trees of each of the following varieties of peaches: Crosby, Crawford's Early, Reeves' favorite, Globe and Elberta. The plants had been taken up from the nursery without mutilating the excellent root system which they possessed. The side branches of the apple trees were cut back about one half and the peaches to one or two buds. In this condition they were planted, soon after having been received.

"December 14 ten of the apple trees and seven of the peach trees were dug. Of the apple trees none of the roots had formed a callous on the cut surface, but seven of them had made a root growth of one or two inches.

"April 9, 1898, one tree each of Ben Davis and Shackleford and two trees each of Winesap and Oldenberg were planted adjoining those left standing in the fall. July 2, all were dug and the following notes taken: Ben Davis, fall planted, top growth 14 inches, root growth 8 inches; spring planted, top growth 12 inches, root growth 5 inches, both having numerous fibrous roots. Shackelford, fall planted, top growth 17 inches, root growth 5 inches; spring planted, top growth 7 inches, root growth 9 inches, young roots scattering and not as numerous as Ben Davis. Winesap, fall planted, top growth 12 inches, root growth 8 inches; spring planted, top growth 7 inches, root growth 6 inches, young roots very scattering. Oldenberg, fall planted, top growth 7 inches, root growth 7 inches; spring planted, top growth 10 inches, root growth 8 inches. Only a few fibrous roots on the fall planted trees, but a mass of them on the spring planted trees.

"In addition to the apples the following peaches were also planted April 9: One tree each of Reeves' Favorite, Crawford's Early, Crosby, Elberta and three trees of Globe. July 2 they were dug and the following notes taken: Reeves' Favorite, fall planted, top growth 18 inches, root growth 9 inches; spring planted, top growth 8 inches, root growth 5 inches. Crawford's Early, fall planted, top growth 23 inches, root growth 8 inches; spring planted, top growth 18 inches, root growth 3 inches. Crosby, fall planted. top growth 17 inches, root growth 7 inches; spring planted, top growth 16 inches, root growth 8 inches. Elberta, fall planted top growth 18 inches, root growth 8 inches; spring planted, top growth 9 inches, root growth 8 inches. Globe, spring planted, average top growth 9⅔ inches, average root growth 6⅓ inches. It was observed that with peaches the spring planted trees were slower in coming into growth. Those trees planted this spring were heeled in during the winter."

These experiments both at Lincoln and at St. Louis, show that planters are right in believing that fall planted trees may make some root growth in the autumn, succeeding planting, and in the spring before the leaves start. The experiments were not designed to answer the question as to whether or not fall planting is desirable. That depends upon many other things but chiefly upon climate. The growths recorded by Mr. Irish indicate that in the locality of St. Louis fall planting gives good results, while upon the plains it is generally found to be unsatisfactory, owing largely to the dry open winters.—*Southwest.*

WHAT APPLES TO PLANT.

Hon. N. F. Murray, president of the Missouri State Horticultural Society, believes there is no other market variety so profitable as the Ben Davis. He advises planters to set out at least one half the orchard in Ben Davis, the other half to consist of Jonathan, Winesap, Mammoth Black Twig, Grimes Golden Pippin, Gano and York Imperial. Mr. J. M. Bechtel, of Burlington, Iowa, recommends Ben Davis and Winesap, but does not say in what proportion he would plant.

Mr. Homer Reed, of Kansas City, believes that the Ben Davis will produce more than double the number of strictly first-class apples of any other variety. Frank Holsinger, of Rosedale, Kas., for market varieties, recommends Gano, Ben Davis, York Imperial, Missouri Pippin, Jonathan, Huntsman and Maiden's Blush. For family use Mr. Holsinger recommends Yellow Transparent, Early Harvest, Red June, Cooper's Maiden Blush, Jonathan, Huntsman, York Imperial, Gano, Ben Davis, Winesap, Missouri Pippin, Paradise W. S., Janet and Ingram. Mr. Holsinger is a large grower of apples. Hon. Edward Taylor of Edwardsville, Kan., recommends Ben Davis, Jonathan and Missouri Pippin. Ben Davis, half the orchard in solid block; rows 30 feet apart, north and south, 15 feet apart east and west. The other half alternate, east and west, of Jonathan and Missouri Pippin, rows 15 feet apart; north and south rows 30 feet apart. L. A. Goodman, Secretary of the Missouri Horticultural Society, says Ben Davis, and if you want to plant 1,000 Ben Davis, plant one half Gano. In the north half of the state he says Jonathan will come in second, and he says Winesap, which includes Mammoth Black Twig, an improved Winesap, should come in third. Next would come York Imperial. Judge

F. Wellhouse of Topeka, Kan., recommends Ben Davis, Missouri Pippin, Jonathan, Gano and York Imperial. He plants 16 feet apart, north and south, and 32 feet east and west. We have gleaned these statements from the "*Western Fruit Grower*," and the lists will be a guide to future planting.—*Coleman's Rural World.*

BEST SOIL FOR APPLE GROWING?

Editor Rural World:—I believe the Ben Davis to be the best apple tree to plant. I have noticed that greenbacks generally follow the discovery of facts. Our grandchildren will profit if we now learn the exact geological formation best adapted to apple growing. We can do without surface cultivation of blackboards for some time. Would assign the Chariton river valley to one scientist, the Grand river valley to another, and so on. We need the truth concerning this matter—and nothing but the truth.

MACON COUNTY, MO.

THE MISSOURI FRUIT QUESTION.

Missouri's fruit industry, largely apples, has grown to fifty times the extent it was fifteen years ago, yet to-day there is not one acre of orchard in Missouri where there might be one hundred. Ten years ago the State ranked twelfth in fruits. Last year 1897 it was first in value and character of the crop. New York and Michigan have lead for several years as far as apples were concerned. But we are outstripping them. We have in Missouri, more good fruit land than any other state. Indeed, there is scarcely a county in the State where there is not land available for this purpose. The Ozark peaches are finer in color, size and quality than the famous Deleware and Maryland peaches—and sell ahead of them in the markets. The Eastern buyers formerly objected to buying Missouri apples because they were unacquainted with them. The market was accustomed to the New York and Michigan varieties, which we do not cultivate largely. This objection has been overcome. Indeed, we have brought the Missouri varieties into especial prominence. For example, the Huntsman's Favorite is a Missouri product, first raised in Johnson county. The Missouri Pippin, the Mammoth Black Twig and other well known varieties are Missouri grown. The Ben Davis, because of its size, color and shipping qualities, sells best. The Missouri Ben Davis is entirely different from, and vastly superior to, the Eastern Ben Davis. The Missouri apples sell in Germany ahead of any other. I shipped a few weeks ago, from Kansas City direct to Hamburg, a carload of Missouri apples. They sold at $6.50 a barrel. It cost me $1.50 a barrel for transportation. The Ben Davis sold one dollar higher on the barrel than any other variety. The apples which almost caused an international complication between the United States and Germany were from Missouri orchards. Germany at first refused to permit them to be unloaded, fearing they had fruit pests or insects. The funny thing about this objection is that all our fruit pests and insects were originally imported from Europe. If any were refused, it would simply be refusing the return compliment. There is no crop that will pay the farmer of Missouri better than apples. An apple orchard costs the time it begins bearing from $20 to $35 an acre. This includes cost of trees, planting and care, but not the cost of the land. One good crop of apples will pay all of this. An apple orchard will bear profitably from its seventh or eighth year until it is twenty-four or twenty-five years old. There will be a good apple crop three years out of five. We have averaged more than this, the last fifteen years. Of course wheat and corn will yield a crop the year they are planted, while fruit will not for several years. But even counting this and taking a twenty-year period, including the seven or eight years when the fruit trees do not bear, yet the fruit crop will be worth at least four times as much as as any other crop from the farm. Last year (1897) a Johnson county orchard grower received $30,000 for the fruit on his 300 acres, an average of $100 an acre. A Howell county orchard-grower was paid $90 an acre for fruit from land which originally cost him only $5 to $8 an acre. At Westport is an orchard which has yielded an average of $40 an acre for twenty years, counting in bad and good years. There are hundreds of instances like this. And commercial orcharding in Missouri is but in its infancy. Fruit growing pays largely not only for the man who cares for for his own orchard, but for him who employs others to care for it. That is, it pays as an investment. Of course, care and common sense must be used in this, as in all other investments. There is no better land in the world for apples than the Missouri ridge-land. The white oak country, it is called in some sections. There must be a good subsoil. Wheat and corn will grow all right if the top soil is good, but fruit will not. The chief drawback to the fruit industry is the insects. These pests are the bane of the Horticulturist's life. Our Entomologists are fast getting to understand them, however, and we can fight them better than before. When science can discover how wholly to get rid of them, we will be perfectly happy. But even in this matter Missouri is better situated than the older fruit states. We are bothered much less.—*L. A. Goodman in the Prairie Farmer.*

KEEPING APPLES.

At a meeting of the Missouri Valley Horticultural Society, one of the members, a Mr. Davison, gave a description of his method of keeping apples. His cellar is 80 by 40 feet, and about eight feet deep, built of stone, says the *Michigan Farmer.* He has a chute running into the cellar to run the apples down. He then sets the barrels (without heads) one on the other, three high. The cellar has a large double door in the end and regular temperature is maintained by opening and closing this. He opens at night to admit cool air and closes in the day time, and by this process a comparatively uniform temperature is maintained. The upper story can not be kept as cool as the lower, and in this he keeps the apples that are to be sold before the holidays. In building such a structure he advises the use of stone in the lower part, but wood for the upper, as it can be kept cooler.

Mr. Goodman, another member, reported that in his cellar he could keep from 3,000 to 4,000 bushels of apples. He first sprinkled with a solution of copperas, then piled the apples in bins as high as possible. Upon being asked for his opinion on ventilation, he said that they did not want too much; that it was his experience that the apples exposed to the air, rotted worse than those in the middle. Apples left in piles have a greasy coating formed on the outside, and if they once reach this stage they are comparatively free from rot. This coating is formed in from six weeks to two months, and most of the rotting is done during this period. The cellars should be sprayed or sprinkled frequently to stop all fungus growth. Mr. Goodman also advocated building storage houses over springs, as the flow of water will keep the house cool, and also give sufficient ventilation. Another method, where ice is kept, is to have the apples stored in a cellar under the ice house, the floor above being tight to prevent leakage. This is approximately the method for cold storage adopted by one of the cold storage houses in Kansas City, in which apples have been kept for three years with remarkable good results.—*Colman's Rural World.*

Apple growing in America began in 1640, only twenty years after the Mayflower came. The first orchard was on an island in Boston harbor. The first nursery was set at Danvers by Governor Endicott.

Apple trees have been known to reach the age of 1000 years. And trees 200 years old are common. But best authority gives the life expectation in Iowa at 30 to 40 years.—*Iowa Fruitman.*

DOES WINESAP RESIST MOTH?

At about the time apples were gathered, Hon. E. L. Smith, president of the Oregon State Horticultural Society, wrote an article to his local paper at Hood River, in which he threw out the hint that there might be some resistance in the Winesap apple against the codling moth. What is the experience of the growers in this respect? He says: The codling moth, as you are well aware, has done us serious damage this season, and threatens to destroy, to a great extent, the value of the orchards in the future, unless efficient means are taken to check its ravages. Systematic and timely spraying, so far, has not been practiced in the valleys to my knowledge. Evidence, however, is not wanting that Paris green, properly applied and at the right time, will insure a large percentage of merchantable apples. There is, however, difficulty in procuring Arsenical preparations of requisite strength and purity, and some uncertainity as to the proper time to apply them. If, therefore, we can find a variety that possesses, to a great degree, immunity from codling moth, it is certainly a matter of great importance to us. On my Beulah Land place is a small group of old apple trees that have never been sprayed and have received but indifferent cultivation. I gathered the winter apples from these trees a few days ago and found a large percentage of wormy fruit. Missouri Pippins, Greenings, etc. Four Winesap trees, standing in the center of the group, were singularly free from the work of the codling moth. In other words, I have over eighty-five per cent of sound Winesaps, against forty per cent of sound fruit of other varieties. These facts attracted my attention, and I hastened to make inquiries of growers—Singerland, Kepke, Docke and several others—and everywhere I find that this variety is a resistant variety, to a greater extent, than any other grown in our orchards to the attack of this pest. I believe that the fruit is so very hard that the larva of the codling moth finds great difficulty in effecting an entrance.—*Prairie Farmer.*

BUD SELECTION.

The classic example of the nectarine springing from the peach and the peach from the nectarine is familiar to all and occurs at present with frequency.

In California, in an Isabella vineyard belonging to Mr. J. F. Pierce, of Santa Clara, several vines sported in the year 1882. The grapes on these sports were black, with a light bloom, immense in size, and exceedingly sweet and delicious. The foliage was large and the vine a strong grower and a prolific bearer. This grape was disseminated under the name "Royal Isabella" and "Isabella Regia," but recently it was taken up by Mr. John Rock, of the California Nursery Co., and named the "Pierce" by the State Horticultural Society. The Pierce has been cultivated under all conditions and shows no tendency to revert to its parent form, and I am informed by Mr. Burbank that it is now extensively grown in California and brings higher prices for table use than any other of the American or vinifera types.

The grape is prone to bud variation, and it is not uncommon to see a blue grape with a branch bearing a white grape, or bearing a grape of a similar color and large size.

In cherries, pears and apples there have been numerous instances of bud variations.

About 1878, Mr. E. C. Banks, of Waterville, Ontario, Canada, noticed a branch in a Gravenstein apple tree with fruit of a darker and a different color from the usual type. This apple is now being propagated, and I am informed by Mr. Banks that the fruit brings 50 cents to $1.25 per barrel more than the ordinary Gravenstein, and that it is equally good in size and has better keeping qualities. The apple was named the Banks' Gravenstein at the World's Fair and it promises to be an acquisition to the list of fall varieties. There is a striped variety of Fameuse which is propagated, Professor Budd informs me, and the Baldwin and the Astrachan often throw sports.

One of the most interesting cases of bud variation I know, occurs in a peach orchard of P. L. Cannon, at Bridgeville, Delaware. A few years ago there appeared a couple of branches on a Mountain Rose tree bearing fruit which ripened a week or ten days earlier than the Mountain Rose.

It is hardly necessary to point out that most of the varieties of potatoes, horseradish, sugar cane, bananas and some onions have been produced from bud variations, as they are not multiplied by seeds.

The Golden Queen raspberry is probably a sport of the Cuthbert. It originated on the grounds of Edward Stokes, at Berlin, N. J., and was introduced to the public by J. T. Lovett.

The list of bud varieties could be largely extended. Thousands have undoubtedly been produced which have escaped the notice of Horticulturists. Between the violent variations of sports, and the slight variations of all buds, there is every gradation, but only the striking ones have attracted attention. In the future, however, we shall hear more of bud variations, because we are coming to feel that every bud has its own individuality, which can be be increased through propagation.

But to look to the gradual upbuilding of Horticulture through sports is as erroneous a principal as to depend on chance seedlings to accomplish the same end. In fact, sports are not to be looked upon with any hope of permanent improvement. Nature's method of evolution is by gradual evolution is by gradual extention, and sudden outbreaks in any direction are out of harmony with the surrounding conditions. It is the slight extention of roots or a larger leaf surface or the slightly larger or smaller trunk that gives a tree an advantage over its competitors.

Now, as I have already pointed out, bud varieties are not rare, as every bud is truly a variety in that it differs from every other bud. This being true, then have we not here a vital principle on which to begin systematically the improvement of Horticultural types?

In the present lists of fruits are numerous excellent varieties, and the way to secure better ones is to make them. The requisites to this end are, first, an ideal or the improved type desired; second, judicious selections through successive generations of scions of buds from branches whose fruit approaches the ideal; third, high culture to stimulate variation.

Horticulturists have never made a systematic attempt to improve a variety after it once appears, or even to maintain its standard of excellence, for improvement has ever been looked for through new varieties. The present system of propagating fruits in the nursery, or on the farm, as followed by most fruit growers, tends to deteriorate a variety. Buds are selected from bearing trees, or from non-bearing trees, or from nursery trees. The effect in every case is to transmit the tendency already existing in the bud to the new tree, and as a result there are orchards scattered all over the country in which there are many trees that, even with the highest culture, will not pay the interest on the land they occupy. Nine orchards in every ten have been propagated with no more care in selecting the buds from which the trees came than was exercised in the propagation of the Fay's plantatoin already mentioned. On a large fruit farm with which I have been connected, this principle has been considered so important that every young orchard is top worked with buds from trees which have shown a bearing habit for years.

In conclusion, then, the following points seem worthy the study of every Horticulturist:

One. The tree is made up of a collection of individuals or buds, no two of which are alike, because of dissimilar conditions surrounding each.

Two. The differences in various buds are hereditary.

Three. Organic evolution has taken place by the selection in each generation of those differences which give the survivors a slight advantage in the struggle for existence.

Four. Applied to Horticulture, this law in one of its applications would read: Varieties can be maintained and improved by selecting buds from the trees or branches which are superior to the whole orchard.

Five. To depend on chance seedlings or sports for new varieties removes Horticulture from a scientific basis. *American Gardening.*

G. HAROLD POWELL, Newark, Delaware.

PEARS.

FALL AND WINTER PEARS.

Fine-skinned, smooth Bartletts still seem to hold their own for the late summer and fall trade. The heavy yield of these trees, and the ready market which they find makes them a profitable pear to grow, writes S. W. Chambers, in the *American Cultivator.* Bartletts are not by any means the best pears for home use, for the common Seckel, Flemish Beauty and many dwarf varieties far surpass them in my estimation, but owing to the handsome appearance of the former fruits they will always command good prices. The buying public still judge of fruits, largely from their outside appearance. The Bartletts are juicy and sweet, but one soon sickens of them if plenty are to be had. They ripen so rapidly, and then become so soft and squashy, that one must use haste in selling them. They must be pulled off the tree when quite green, and allowed to ripen in a dark room to get the best results.

The old Flemish Beauties are bright, red-cheeked pears with a dark, greenish color, but of late years they crack open and spoil in many sections, so that they are unfit for market use. The flavor of these pears is delicious, and beyond comparison. They never sold very well in the general market, and of late years their cracked surfaces have caused them to fall into greater disfavor. Those who know them, however, would always prefer one to almost any other variety of pears, cracks and all included. The cause of this cracking open of the fruit must be due to the soil in some way, but the weather is partly responsible for their injury. In very wet seasons the cracking is a great deal worse than at other times.

The Anjou come in later in the season, and owing to their tough skins are enabled to stand inclement weather. They are very seldom knotty and cracked, and they sell pretty well in the average market. They are abundant producers, and should not be neglected in any orchard. The stings of insects can not injure these pears as much as the Bartletts or Flemish Beauties, for their skins are so tough and thick that the stings hardly penetrate through to the meat of the fruits.

Good fall and winter pears are always in demand, and owing to the small quantity grown the prices are generally high. They should be ready for market just at the close of the season for summer fruit. This is generally when the grape supply is beginning to dwindle down. There is a demand for fruit then, and it can be supplied with the late fall pears; but if one waits too long the other fruits come in and cause prices to decline. Some of this fruit can be kept for the holidays, but only such pears as have fine, fair outside appearances.—*Rural World.*

GATHERING PEARS.

One should keep a calendar of pears if he has many varieties, to be sure that he will remember just when they should be picked, and how long they should be kept after picking and how they should be handled to have them at their best when ripened. There are too many kinds for one to keep them all in his memory if he has to remember and watch other crops as well. Most of them do better if picked before fully ripe, and ripened slowly in a dark room, and at a temperature of about forty-five degrees. A high temperature hastens ripening.

The Clapp's Favorite should be gathered as soon as any ripe ones begin to fall, and should be marketed very quickly, as it is a poor keeper. Nor does it seem to keep longer if picked earlier, while it is lacking in flavor if not nearly ripened on the tree. The Bartlett may remain on the tree nearly a month later, and then, at the temperature we have named, may be kept from two week to a month before being ready to eat, as not all will ripen at one time. Those from the centre or north side of the tree where they have had but little sun ripen very slowly.

Many of the late pears, or winter pears, should remain on the trees as long as is possible without danger from frost and then should be stored in a dark and cool place. They may be made ready for Christmas trade, or kept much later if desired. Of course, those who can patronize the cold-storage warehouses can keep their fruit much longer, and the dealers will have pears there almost until early pears come again, but the demand is so limited tor them after Christmas that it scarcely proves profitable even at the high prices they ask when they sell them —*American Cultivator.*

FIGHTING PEAR BLIGHT.

An address on "Pear Blight" was given by Prof. M. B. Waite, of the U. S. Department of Agriculture, assisted by blackboard sketches and colored drawings of the disease in all its stages. He traced its history from seventeen and ninety-three, as mentioned by Wm. Denning, of New York, down to the discovery in eighteen and seventy-nine, by Prof. Burrill, of Illinois, that it was as truly the work of a living creature as that of the psylla or scale—a microbe, though one of the smallest of its class. These microbes are found in abundance in the disease, can be cultivated, and the disease reproduced in healthy trees. They can not be killed by cold, but die at temperature of very hot water. The host plants are the pear, apple, crab, quince, sarviceberry, etc. The microbes move *en masse* from one cell to another, breaking down the cellular walls, passing in millions through and between.

In blossom blight the microbes appear in the nectar and penetrate the nectaries, multiply and go down the stem. Bees visit the blossoms and carry the microbes from flower to flower. The disease spreads with great rapidity; only the brief time of blooming cuts this short. Spreading through the fruit spurs, these are killed to the bough. The virus, when it appears outside, can be carried only by special means—birds and man. Even after blossoming, there is possibility of infection of the green tips. The disease may also start in tender growing bark. In artificial infection in the field it was never spread except where punctures existed. When started in tender twigs, it spreads downward till it meets cells too firm to be affected. From the fruit spurs it will spread up and down, girdling the branch. If the woody cylinder is uninjured, the branch may live a year or more; but hot, thunderous weather causes the microbes to overflow into the cylinder, and the branch collapses suddenly. The microbes die if they cannot spread. If any of them live till fall, they may live over till sap runs in spring, and then spread rampantly. The hold-over blight will spread upward, and the gummy virus run down, ready to spread the infection.

The blight varies according to the tree; some varieties are easily attacked, others are more or less immune. It has nearly driven out the Bartlett and Vicar from southern orchards. With very fertile soils and rapid growth, pear culture is almost hopeless. Fertilizers have an effect on the disease, but it is not easily shown. In an experiment with two hundred pear trees in pots, intended to show the effect of nitrogenous manures on blight, *all* the trees blighted. Moisture favors the disease; drouth restricts it. The one factor is presence of the germ, no matter what are the conditions. Bordeaux mixture will kill most of the microbes, not all; this would require constant spraying. Filling holes in the trees with drugs is nonsense.

The true remedy is, first, cutting out all diseased wood intelligently, and cutting out late in the season all hold-over blight. In August and September the twig blight is plainly visible. Cut out all such twigs and branches down to sound wood. If blending into sound wood, give wide margin—one to two feet. Be careful that bark is sound where cut. Do not cut into sound wood with infected knife. If you do, cleanse knife with disinfecting solution. Cutting out in the growing season is not of much use, the disease spreads so rapidly. It may, however, be done in periods of drouth. [Several members said they had been successful with summer cutting—say five times.] Treat the disease always as infectious. Watch every evidence, and destroy at once.

With fruit spurs low down and sprouts on trunk, the blight gets quickly into the center of the tree. We must train and prune our trees differently. To fight the disease, the vase form of top is better than the pyramidal. To produce the former, grow three shoots on stem, cut back and grow two on each of these, cut back and grow two more, and so on. [Prof. Waite illustrated the plan on the blackboard.] This produces a low head broad at the top, with fruit spurs above and smooth limbs below. This prevents the rapid spread of the disease and aids in cutting out when it gets a foot-hold. The pyramidal form may also be modified to carry out this plan. Prevention is better than fighting.

Before Hudson Valley Horticultural Society.—*Country Gentleman.*

THE OZARK PEAR.

Sixty years ago an amateur horticulturist brought from Kentucky to to Southern Missouri a few seeds of what was supposed to be a cross between the apple and pear, says *The Southwest.* The seeds he planted in Polk county, Missouri, and from them obtained a tree of the apple type, which, upon coming into bearing, produced a hybrid fruit, in looks resembling an apple, but in quality being like a pear. This tree, now fifty years old, still stands at Greydon Springs, Missouri, in a healthy condition, never having been attacked by blight or other disease. The same may be said of a tree near by, which was grafted twenty years ago. For half a century the original tree bore annual crops of pears before any one discovered what a bonanza it might prove to some nurseryman, or introducer, who would push it to the front.

About five years ago, however, Mr. John Gabler, a Springfield Missouri, nurseryman of many years' experience in Germany and this country, nvestigated the pear, and appreciating the value it would prove to fruit growers, he gained control of the original tree. Since then he has been propagating it, until he now has several thousand fine trees, which he has decided to offer for sale. Mr. Gabler named the new variety the "Ozark pear."

For the benefit of our readers *The Southwest* recently interviewed Mr. Gabler in order to get the real facts about the pear. Upon being asked for his experience with it he said:

"Five years ago I planted twenty-five varieties of pears, some from Europe and some from the east. The blight killed them all. I had a few of the Ozarks planted side by side of the blighted trees, but they never showed a speck of that dreaded disease. After many years' experience I consider it the best blight resisting pear extant."

"How about the quality of the Ozark?"

"That is one of its best points. All who have tasted it say it is one of the best flavored pears they ever ate. As a pear for canning it can not be excelled by any, not even the Bartlett, but for that purpose they must be gathered about ten days before ripening. When ripe they make a preserve which is better than any berry or other preserve that can be put up. As an eating or market pear I say this: California can not turn out an article which is better in looks and quality. The flesh is white and juicy, of a mildly sweet flavor. California pears brought during the whole season from $1.75 to $2.25 per forty pound box. Therefore a man of enterprise who plants an orchard of the Ozark variety will be able to sell his fruit in the markets for California prices, without having to spend half of his money for shipping."

"How about the appearance and keeping qualities?"

"It is an oblate, greenish yellow pear of large size. When ripe it is about the shape and color of the Huntsman's Favorite apple. Good specimens will weigh nearly a pound. Last season I had some specimens on exhibition in a show window in Springfield, and after lying three weeks in the sun they were perfectly sound, and were in fine condition for eating. The fruit ripens unevenly from the tenth of August until about the tenth of September, a great point for an orchardist. He does not want to market them all in a few days for fear that they may rot on the core, as many varieties do. The Bartlett is one of the most popular pears, but it has several drawbacks, one of which is that it does not keep well when shipped far. The Keiffer is a good keeper, but lacks flavor.

"Another point in favor of the Ozark is its late blossoming tendency. It blossoms about one month later than the Keiffer, and this year bearing trees of the Ozark variety had a good crop, while nearly all other varieties were killed by frost."

Unlike most introducers of valuable new fruits, Mr. Gabler has had no patent taken out for this pear, but every nurseryman is given a chance to add it to his list. Mr. Gabler is a worthy and reliable man and we hope he will have a large sale of trees during the season of 1898–99.—Colman's Rural World.

THE WORDEN-SECKEL PEAR.

It must have been about the year 1892, that the Smiths & Powell Co., Syracuse, N. Y., first sent us a box of this excellent pear—a seedling of the Seckel raised by S. Worden, of Minetto, N. Y., the originator of the Worden grape. A few pears were again sent to us September 27. They are almost exactly the shape of Seckel, though some are more pyriform and fully one third larger. We hesitate to say that the quality is better than that of its illustrious parent, but we do not hesitate to say that it is fully equal to it, while the tree has the advantage of bearing at a younger age The color of the pear is much like that of its parent, being a rich yellow sprinkled with russet dots, and of a bronzy-red color on the part exposed to the sun. As it originated near Oswego, where the original tree has borne regular crops for more than ten years, it is fair to conclude that it will succeed in so far as severity of climate is concerned, wherever pear culture has proved a success.

We are not alone in our high opinion of the Worden. The Storrs & Harrison Co., pronounce it of "superb quality." The Rochester Nursery Company says: "It is equal to, if not ahead of, anything in that line that we have ever tasted." Mr. George T. Powell has pronounced it, "One of the greatest acquisitions to the pear supply of recent years." Prof. I. P. Roberts expresses this opinion: "I consider this a very valuable variety and well worthy of a place among the best in the country." Hoopes Bros. & Thomas say this: "It is almost if not quite as good as its parent, that famous old standard of excellence." Mr. S. D. Willard expresses his opinion as follows: "The world will have the satisfaction of having a better pear when this is disseminated that in has ever known before."

STONE FRUITS.

SELECTING THE PEACH TPEES.

EDITOR OF THE AMERICAN CULTIVATOR:

There are many kinds of soil in which peach trees thrive, from the poor, gravelly lands of New England to the stiff, heavy, clay soils of Michigan, but in none of these soils will poor, unsuitable trees produce profitable crops. The selection of suitable trees is thus more important than the soil. While the peach trees naturally prefer a light, warm, well-drained, sandy soil, they will produce good crops on heavy clays, light, pine sand, and all sorts of gravels and clays. New trees for the orchard should have smooth trunks, and well-grown and abundant roots. Moreover, the roots should not be closely pruned. If they are pruned any more than just enough to remove mangled and splintered roots, the trees should be rejected. It is always well in ordering peach trees to have written specifications covering these points. None of our fruit trees are more likely to pan out poorly because of improper delivery than the high-grade peach trees.

It is particularly desirable that peach trees should be free from fungi and injurious insects. Peach growing has been seriously affected in the Eastern States by the spread of the San Jose scale. The spread of this scale was due to the carelessness of two or three New Jersey nurserymen, who imported infected trees from California. The scale has spread from this one place to hundreds of orchards in nearly every Eastern, Middle, Western and Southern State. It goes to show how important it is in obtaining trees that are absolutely free from all injurious insects or fungi If there is any doubt about the matter, it is better not to purchase the trees at all from a region where diseases are widespread. Besides being careful in selecting trees free from the San Jose scale, those unaffected by borers and root aphides should be chosen. It is better to pay a little more for trees that are absolutely free from all diseases than to handle some that come from doubtful localities.

August-budded trees give better satisfaction when obtained from nurserymen than June-budded trees. But if the trees are raised on the farm the seedlings should be budded in June. By this means we obtain a grafted top the same year. As a rule, the budded stock does better on peach roots; but if the situation is low and the soil rather heavy plum stock is sometimes superior to peach. When budded on plum stock the trees should be planted closer together. The average is from 12x12 to 15x15 feet. The Marianna is a poor variety of plum for grafting or budding peaches on, and it should never be used. It makes a poor union with the bud, and always gives dissatisfaction. There are several varieties of plum stock, however, which make a good and lasting union. On certain varieties of soil, peaches raised from budded plum stock do much better thas those raised on peach roots. One must of course be the judge of his own orchard, and its needs. S. W. CHAMBERS, New York.

PLANTING DORMANT PEACH BUDS.

In a recent number of *Colman's Rural World* Brother Sam Miller discusses the subject of transplanting dormant buds. It seems to me a more practical way, and one I have adopted, is far superior. On transplanting the dormant bud to the plantation on which it is to grow, I trim the tree to a switch. I then girdle the tree immediately above the bud. The tree indicates the budded stock and protects it in cultivating. By this process there is no rubbing off of buds. There is no necessity of grafting wax, all you have to do is when the bud is well developed and large enough to be seen is to cut off the old stock at the proper place, i. e., just above the bud. I have had trees make three to four feet of growth by this method the first year. One thing remember, to always set the buds the same way with the row, as it will assist you materially in keeping track of it.

The stock of the tree can be used as a support to the bud, being tied to it, thereby preventing blowing or breaking off. Should any buds fail, by a little care a stock can be prepared for budding again, and but little time lost in bringing into bearing.

PEACHES FROM NATURAL PITS.

F. H. Wheeling, W. Va.—Will peaches grown from natural Tennessee pits be superior to those from northern-grown seed? If so, where can I secure the former?

ANS.—In my opinion, there is considerable misunderstanding about the so-called "Tennessee natural" peach seeds. Really there is no such things as a natural peach seed this side of the native home of the wild peach, which may be Persia, or perhaps, no one certainly knows where. What is meant is seeds from seedling trees such as are commonly grown among the less progressive fruit growers of the mountain regions of Tennessee and adjacent sections. These seeds are usually very vigorous and healthly, and are likely to produce vigorous seedlings like the trees from which they came, because that region is very suitable to the peach. Such seed is better than that from Early Crawford and some other improved kinds, but, in my opinion, no better than the seed from Mountain Rose and many other kinds. Such seeds as may be got from any section where there is no peach yellows or other similar disease, ought to be be as good as that from Tennessee. The soil and climate of the mountain regions of West Virginia are much like those of Tennessee. If the seed can be got from vigorous seedlings having poor fruit, it might be preferable. It is quite true that, in some cases, the fruit has been improved in size and and quality to the detriment of the constitution of the tree and the vitality of the seeds. This is the chief reason for any argument in favor of the so-called "Tennessee natural" peach seeds.

H. E. VAN DEMAN.

LENGTHENING THE PEACH SEASON.

It is something of a surprise to some that the Elberta peach is yet seen on our markets. It is nearly two months since the Elberta made its appearance, and are still here.

First they came from the far south, and not a day since but they could be found in our markets.

Our home grown Elbertas have been here for over four weeks. Why is this? It is because of treatment of the orchards. Trees that are neglected will ripen up their fruit much earlier than where cultivated and keep growing.

Mr. Gano, of Parkville, has been marketing the finest Elbertas coming to our market the past week and getting 70 cents per peck basket. Being asked his treatment of orchard, said he had manured and cultivated continuously. This is the statement of others also who have been marketing Elbertas the past week. This is a matter well worth remembering by the peach grower, giving him a longer time in which to handle this splendid fruit.—*West Fruit Grower.*

MAKING A PLUM ORCHARD PAY.

In order to make a plum orchard pay one must be sure to start it right, by planting those trees that are hardy in our climate, and those that fruit every year, or so select varieties that at least part of the orchard will bear every year. Next to the proper sorts planted, comes location, soil, proper cultivation, thinning the young fruit, manuring and finally picking and marketing the fruit. In this region perhaps the very best plums to plant are our large and improved natives, for these are adapted to the hardships of our climate. For thousands of years these fruits have been subjected to the great law of "Survival of the fittest," until we have trees that bid defiance to scorching sun, insect pest and howling blizzards; while foreign varieties must meet these climatic difficulties, and soon give up the struggle and perish. A northern slope with rich soil is the ideal location for a plum orchard, but if this can not be had, any good corn soil will do. The ground should be plowed and pulverized and trees set in rows fifteen to twenty feet apart and twelve feet between the trees. Trees should be selected of different varieties alternated. Care should be exercised to select varieties that bloom at the same time, so as to assure cross fertilization of the blossoms; this gives more abundant crops of fruit, and we think also of better quality; for fruit from trees that have been fertilized by other varities is always larger and of better quality than the fruit from trees of self fertilization; especially is this true if the pollen is from large, fine varieties. So in setting an orchard it is very important to plant varieties that bloom about the same season close to each other. Abundant manure should be given a plum orchard and as faithful cultivation as any corn crop. A bearing plum tree will stand more manure and cultivation than any other fruit tree I know of, and the fruit should be thinned by shaking the trees, as well as picking when the fruit is quite small, for it is the formation of the seeds that saps the vital force of the tree, so the sooner the thinning process is commenced after the blossom falls, the better. If the ground has been highly enriched and the thinning process has been done thoroughly, the fruit will be one third larger and better quality than where these two important items are neglected. Where the highest results are looked for in smooth, clean fruit, the insects should be fought either by the spray pump, or jarring the trees and catching the "little turks" on sheets and then destroying. We have had but little experience in this warfare, but feel quite sure the jarring is the most effectual for the plum gouger and curculio.

When the fruit is ready to market it is very important to pick the plums instead of shaking them off, which bruises them and hastens their decay in the market. Nearly all our native plums, and Japanese as well, are better when picked before fully ripe, and left to ripen in a fruit house, or in small baskets on the market. They keep longer, and the fruit is fully as good. If a plum orchard is treated along the line given in this article the question will be solved, "How to make a plum orchard pay," and feel sure there is no tree fruit in Iowa that will pay any better.—*Prairie Farmer.* A. B. DENNIS.

JAPAN PLUMS.

Next to peaches, plums are the most valued of stone fruits, but of late years the ravages of the black fungus knot has placed plum culture among the high arts. Many of the large growers for market have abandoned the attempt to grow the older well-known varieties; I know of but one grower in this district who has any success in their culture, and he, acting on the old maxim "the better the day better the deed," makes a regular tour of his plun orchard every Sunday during the season, with a sharp knife cutting out clean every trace of the knot he can find, some branches are almost severed, but the trees thrive and bear good crops of a remunerative fruit.

There is rarely an evil unmixed with good, and doubtless this scourge of black knot has been largely instrumental in bringing to the fore the great value of the Japan plum, so-called, for some of the kinds now in commerce are the result of crossing our native Wild Goose plum with the Japan forms. The Wild Goose plum is well known for its immunity from the dread fungus and the Japan forms are also practically free from it. In an orchard that was ruined by the black knot I have seen a single specimen of Burbank on which the disease was only on two or three branches and might easily have been controlled; but it was an experiment that seemed to prove that the new race was free from the fungus if given a fair chance.

We were fortunate in having the best two true, and the Burbank is a plum that ought to be planted in every garden no matter how small, if there is only room for one tree. Its only objection is the sprawling habit, but this may be remedied to a great extent by summer pinching of the tips of the shoots. The tree will grow six feet a year in one direction if allowed to, and produce fruit buds the whole length, but if the tips are nipped out there will be a more shapely tree and less danger from breakage when loaded with fruit. We have found the fruit to be of excellent quality, the size, shape, and color of a nectarine, and with a very small stone; this is a characteristic of P. Simon which has probably ages back been one of the progenitors of the race, but any one who describes the P. Simon as palatable must have a perverted taste. It may be described as resembling a Japanese sand pear with a dash of turpentine thrown in.

Another good variety is Abundance, and we have planted it largely; ours seems to be a good form, and as there is more than one kind sold under the name it is well in buying these plums to go to a reputable dealer, indeed this is true of all purchases of plants and seeds too.

It will be found that when trees get to the bearing age, they will produce very large crops; and it pays to thin them out, as much so as with peaches; fruit from a poorly thinned tree is not to be compared with that from a properly grown one, either for flavor, color, or size. It is true that the curculio does a lot of thinning for us, but we prefer to fight him and do it ourselves.

It should be stated that all of the kinds that we have tried are of vigorous growth, much more so than any of the older sorts, and in setting out trees in a garden it will be well not to add manure at the time of planting; it would result in a growth that would be difficult to control for a year or two; it will be much easier to add the fertilizers as they appear to be required. The wholesale cutting out of growth made the preceding year is a waste of the tree's energies, and does not remedy the evil, if it be too rich soil, it only transfers the vigor to fewer branches. It is better to root-prune part of the tree each year than to cut off the top with a view to restricting gross shoots, and pinch freely in summer.—*American Gardenings.* E. O. Orpet, Massachusetts.

SMALL FRUITS.

BLACKBERRY CROPS.

Many of the pioneers remember with unalloyed pleasure the delicious flavor and great abundance of the wild blackberry and have often tried to transfer them to the garden with the hope of picking the same delicious fruit found in the wood lot, but they are always doomed to disappointment. These wild berries rarely or never succeed except in ground heavily mulched by forest leaves and protected by surrounding trees. When transferred to the cultivated fields they encounter new conditions and most invariably fail.

Many of the cultivated berries of to-day, when properly manipulated, are equal or superior to the wild berries. The many failures in blackberry culture arise out of a lack of knowledge of their requirements· Drouth, winter killing and over-bearing are the three great obstacles encountered. All of these difficulties are easily obviated by planting such sorts as Snyder, Western Triumph, Taylor, Ancient, Britton, Eldorado and several others designated as hardy varietief.

No blackberry can be brought to perfection without abundant moisture. This can be secured by keeping the ground full of humus or vegetable matter and then begin cultivation early in the spring and keep it up after every rain. Careful experiments have proven that a loose earth mulch of three inches is best for conservation of moisture. The roots are prone to come near the surface to get the influence of the sun and oxygen of the air, and so if we adopt three inches as the proper depth, great care should be exercised to go no deeper, lest we tear the roots of the plant and deprive them of their feeders and cause them to send up many suckers, which become a nuisance.

The cultivation should continue regularly, at least once a week. When the ground is filled with water in the winter and spring we must not let it get away. Cultivation does not add any water to the soil, but it prevents the supply from getting away. The water draws to the surface by capillary attraction and film movement and cultivation, or making the loose earth mulch, destroys these capillary passages and checks the film movement so water can not raise and must remain below until it is breathed away by the plants.

If the ground be not cultivated frequently early and is packed down by the pickers the growth is suspended in mid summer, the buds form as if for winter and wood ripens. Later the fall rains come and a new growth starts and this does not have time to ripen and so even slight freezing destroys both wood and bud, whereas, if the wood had been properly ripened it would withstand a very low temperature—lower than we often have.

How are we to prevent the fall growth? Having maintained the steady growth until the wood and bud ripening process should begin (about August 1), we sow and cultivate in about four bushels of oats per acre. These promptly germinate and appropriate the plant food and moisture, cutting short the supply of the bushes and their growth will be materially checked and, as the ground is kept cool by the shade, the late growth is quite sure to be avoided, but the value of the oats is not ended here by any means.

Overbearing and pollen exhaustion are also among the factors which soon destroy the life of the blackberry. Judicious pruning is the remedy. Let the bushes bear all they can bring to perfection, but not more. They never fail to set several times as much fruit as they can mature. A patch treated as indicated will carry through more buds than under less intensive culture, and so need'not be pruned quite so close, but it is always better to overdo pruning than to leave too many buds.—*Western Fruit Grower.*

PRUNING BLACKBERRIES.

I think you will agree with me that this is a subject on which a large majority of those who have a few plants in their gardens and also some that claim to be professional gardeners, seem to need a little information; the proof of this assertion we find in almost every family blackberry patch, says American Gardening, and often in the fields of those growing them for market.

The main stem above the lateral branches should therefore be left long enough to secure some good buds above the worthless ones above mentioned; if not it may as well be cut back to the upper lateral branch. This applies to canes that have been left to grow without summer pinching, which, by the way, we like best becouse the canes seem to be less liable to winter kill. If the lateral branches are short and stout, with large, plump buds clear to the tips, they need very little pruning, except when it is desirable to reduce the number of berries produced in order to have them grow larger and finer, as with such sorts as the Snyder, Taylor's Prolific and Wilson's early, which are liable to overbear if not pruned enough, while Lawton, Kittatinny and many others of that class should be pruned long, in order to secure a full crop. The largest yield of very large and fine blackberries we had last summer was on a cluster of chance seedlings that had not been pruned; they grew in a thick mass, three or four varieties in one large clump; the clusters of berries were actually piled upon each other with the weight of fruits, making is difficult to gather them. If you want blackberries to yield large crops, do not plant on rich soil; they are more hardy and productive on rather poor or elevated land. Give clean, shallow culture, or thoroughly mulch, and last but not least, don't prune too closely.—LEVI BILL, New York, in *Prairie Farmer.*

FERTILIZING THE STRAWBERRY BED.

Editor Rural World:—In answering the questions in the *Rural World* of September 1, as to feeding the strawberry bed I delayed, hoping to get some information from our neighbors. Most of us are just beginning to fertilize our plants and can report results better after next season's fruit is harvested.

The ground where our patch grows was pastured for four or five years, then plowed up and a crop of corn grown. The next spring a strawberry bed was planted, and after fruiting two seasons was plowed up and sowed to cow peas. These we plowed under in the fall and fitted the ground for strawberries, and we planted our present patch the next spring. The ground was mellow and fine, an ideal place to plant berries. The only fertilizing the ground has received during the last two years is the straw put on in the fall and burned after fruiting. This year straw is scarce, and after the cow peas began to ripen we gathered a few and sowed over part of the bed. If they are not of value as a mulch they will serve as a fertilizer. Several are experimenting with cow peas this season. At our Horticultural Society one member, who does not believe in burning his bed, sowed cow peas just after clearing his patch. He reported that his strawberries were becoming matted, and with the peas between, would not admit of cultivation. From present indications he would prefer resetting every second season, but would report more fully later in the season. Another berry grower said only a few weeks before his cow peas in his berry patch were a success so far, and he hoped they would prove satisfactory for a mulch.

One of our neighbors who has the largest acreage in this section tried bone meal last year on part of his patch. Not burning, he failed to cultivate sufficiently and there was apparently no benefit resulting from the extra plant food. The oldest and most successful grower of this section was the first man to recommend burning. He stated in one of our Horticultural meetings that he had not used any fertilizer, and he added in regard to the care of the bed when the time came that he could not mulch and burn his bed he was going to quit the business.

E. J. Park, Greene Co., Mo.

PROGRESS IN STRAWBERRY DEVELOPMENT.

The improvement of the strawberry has been slow, but as Prof. W, J. Green, of the Ohio Experiment Station points out (Bulletin 85), there there has been progress nevertheless. No perfect berry for all purposes has been produced, but the intensification of desirable traits and characteristics is going on continually. The Station has grown thousands of seedlings but all have been discarded, although many were more valuable than the majority of those offered for sale. While good varieties are of great importance to fruit growers, there is danger of making the variety question unduly prominent. It would be well to give more attention to intensive culture, as there are but few crops that offer greater inducements in this direction than the strawberry.

The use of water for irrigating strawberries is another means of intensive culture, especially during the season of fruiting. The conservation of moisture is best accomplished the first season by fall or early plowing and thorough cultivation. It is quite necessary to stir the soil after light as after heavy showers, even though no crust is formed.

The following are the most promising of the new varieties: Aroma, Anna Kennedy, Beauty, Copernicus, Clyde, Carrie,, Enormous, Glen Mary, Hall's Favorite, Portage, Ruby, Rio, Staples, Tennessee Prolific, Of well known kinds that can be recommended for general cultivation, Bubach, Brandywine, Greenville, Haverland, Lovett and Warfield are the best.—*Fruit Growers' Journal.*

STRAWBERRY NOTES.

"Clyde with us in the experimental stage gave good berries and good bearing qualities, The variety giving us best results is Haverland. It stood the drought of last year the best of any. Plants are large, vigorous, and healthy color. Yield large, with few small berries, was fertilized with Wolverton that gave us good berries and a good many of them. Warfield was, of course, good. Bubach did not yield like Haverland. Another year may yield more. Would not be without it. First grade Lovetts very good. Second grade Lovetts very poor, color not good, ripens irregularly. Greenville good, but too soft. Schuster's Gem did not do so well as last year, plants hurt by the drouth and did not recover. Crescents did well, but entirely too many small berries. We like the Comet. Except the Haverland we think all our plants were injured by the drouth of 1897. In our experimental beds the Bouncer and Mary made excellent showings. They may not do so well on a larger scale. I am satisfied that a berry that will do well with us may prove entirely valueless in some other locality. Practically every grower must solve the question for himself." JOHN M. HITT, Koshkonong, Mo.

SEEDLING STRAWBERRIES.

Since 1890, over 5,000 varieties of seedling strawberries have been produced at the Experiment Station. A part of these were grown from seed selected from plants that were naturally pollinated in the field. As some plant breeders would claim, this gave an opportunity for natural selection of that pollen best suited to the purpose, though it prevented the possibility of recording the male parent. A large part of these plants, however, were grown from seed which was the result of careful hand pollination, all foreign pollen being excluded, so both parents were known. This will given an opportunity to note the comparative merits of natural and hand pollination, for those who desire to obtain the largest percentage of good varieties, regardless of known percentage on the part of the staminate ancester. The experiment has not so far yielded many interesting results that may yet be gleaned from it, but we are able to state several conclusions that may be of interest, especially to those who contemplate the origination of new sorts.

Of more than 5,000 new varieties not more than half a dozen (or perhaps one in a thousand), promise to be superior to their parents, as market varieties. As a pistillate, Crescent has produced the largest proportion of good varieties of any with which we have worked. Lady Rusk ranks next to Crescent as a pistillate parent to be proud of. Among the staminate varieties Sharpless has been the most successful parent in producing good varieties. Crescent crossed with Sharpless has produced a a larger proportion of good varieties than any other cross that we have made. Certain crosses of good varieties, for instance Warfield and Gandy have been almost entirely baren of good results. Certain varieties show a decided tendency to reproduce their own characteristics, while others are more variable. The seeedlings of Lady Rusk generally bore strong resemblance to their parent. Crescent showed a decided tendency to impress its own characteristics upon its offspring, regardless of the staminate parent used. Gandy, a staminate, though itself a good variety, seemed incapable of reproducing its own characteristics either in seedlings grown from its own seeds, or in cases where it was used as a staminate parent.

Despite the fact that only a small number of these seedlings have as yet proved to possess unusual merit, a large number of them have certain valuable characteristics and are being further tested.

In addition to the above notes, it is well for those who wish to breed strawberries, to remember that they should select for the characters of the whole plant, rather than for a single berry on that plant. For example, it is better to select seeds from the fruit of a plant that produces a good crop of good fruit, than to select seeds from a very large berry, providing it grows on a plant that does not produce a good, all around crop.

J. C. WHITTEN, Horticulturist, Missouri Experiment, Station.

HOW TO GROW BIG STRAWBERRIES.

Editor Western Fruit Grower:

I have been asked how to grow big strawberries for exhibition. Select plants of large varieties and choose large plants. Allow no other plant to grow within twelve inches of them. All within that distance destroy by hoeing up shallow, so as not to disturb the roots of the plant referred to, or these plants may be killed by putting enough mulching on them to smoother to death. Water with liquid manure. This liquid can be made by putting manure (I prefer poultry manure) in a barrel or trough; then pour on water to leach through the manure; place two tin cans, one on each side of the plant, filled with this liquid, the cans having little holes punched through the bottom to allow this liquid to run slowly through. Fill the cans about every third day. Thin or cut off fruit stems, leaving two of the strongest. When berries are about one fourth grown pinch off all berries, leaving only three or four of the largest to mature. I assure you that you will have berries that you will be proud to place on exhibition. JACOB FAITH, Montevallo, Missouri.

RED RASPBERRIES.

The Strawberry Culturist offered a premium for the best article on "A Model Acre of Red Raspberries." Among the best of the contributions was the following by E. D. Brooks, Burton, Mich:

Several year experience in the growing of red raspberries, convinces me that a sandy or clay loam is best adapted to their culture, one which is well drained and easily worked. They will not endure a wet, heavy soil or standing water about the roots.

Raspberries put out new foliage very early in the spring, and should be transplanted just as soon as the ground can be worked and before the sap starts. Put on a disc or other deep cutting harrow, and go over the ground as many times as are required to cut manure and soil fine together to a depth of four or five inches. If no suitable harrow can be obtained, use a two-horse cultivator, running it deep as possible, so that the upper soil is thoroughly stirred, then use a good peg-tooth or Acme harrow, if to be had, supplemented with a roller if lumpy and harrow again, then with a moldboard or turner with a subsoil plow (I use the Oliver Subsoiler) loosening up six or eight inches more.

The object of subsoiling is to form a reservoir under the plants to hold water enough which may be conserved by surface cultivation to carry us through any protracted drouth.

The amount of preparation after plowing will depend upon the nature of the soil, but to insure best results from the start the soil must be well pulverized. Harrow and roll,again as before plowing, then mark off in rows seven feet apart the long way and three feet the other. If planted in hills the potatoes or like crop may be grown the first year in hill between. We use a three foot potato marker drawn by horses to mark the narrow way, and then stretch a line tightly the long distance. In planting, nothing but strong well rooted plants should be used. After digging, cut the stalks back to about six inches of the roots, this can be quickly done by taking several in the hand at once and cutting them with a sharp knife or a strong pair of shears.

Never let the roots be exposed to sun or wind. A good man hold of a light spade will set 1,000 per day. Dig a hole four or five inches deep at each cross mark. Let the boy place a plant in the hole and spread the roots in every direction, then with your spade draw some fine fresh dirt to, and incorporate it thoroughly among the roots so that the crown of the plant is slightly covered. Firm the soil well over the roots, this is very essential, being careful not to break off any new shoots should there be any at time of setting.

If they are planted in the fall, a small fork full of strawy manure should be placed around each plant before freezing weather. In the spring as soon as the ground can be worked, start the Planet Jr., horse hoe, or similar instrument loosening up the soil three or four inches deep between the rows, exercising care not to disturb any strong canes near the hill. We cultivate as we do corn and potatoes, and do not let any ridge work about the row. Clean level culture is always best. A small handful of complete fruit fertilizer scattered around each hill will aid strong cane development of new growth and the present year's crop will be benefited thereby. Not more than five of the strongest canes should be allowed to grow in each hill the second year. Some growers, practice matted row culture after first year, but the fruit is not so good. All suckers not wanted that appear in the hills and between the rows should be treated as weeds and cut off when small. Red raspberries should not be pinched, but all canes desired should be allowed to grow their natural way.

Continue the cultivating, which should be thorough and frequent until the last berries are picked. The ground is tramped down by the pickers and the water is brought to the surface by capillary action, where the wind and sun rapidly dispense with it. Check it at the surface by cultivating every two or three days during the harvesting season. Employ none but careful pickers. Our method is when the plants are large to put two persons on a row, one on either side: this avoids missing any ripe fruit and injury to the bushes. We have a trustworthy person in charge of the pickers who consigns the rows to them and sees that the boxes are well filled with clean fruit, and gives a ticket in exchange for the berries which are delivered. The tickets are of various denominations, the figures representing quarts, so that any number of quarts can be represeeted by combinations of tickets. Some markets prefer red raspberries in pint boxes, but the market here demands quarts.

The boxes are placed in crates by the person in charge and are ready for the market. After the berries are all picked, the old wood should be removed and burned, and the management the remainder of the summer observed same as the first year.—*Western Fruit Grower.*

VINEYARDS.

NOTES ON GRAPES.

Summer pruning or pinching back is a fallacy. As the fruit and foliage ripen there is a curling of the leaf and a shrinkage in foliage volume that admits enough light to ripen fruits, buds and wood.

In Germany and in the great vineyard districts of France, there is a moisture ladened air and slow maturing weather in the fall. Vine dressers, with a lifetime of experience and centuries of accumulated experience behind them, can and must correctly train and dress the vines. If the methods there employed are applied to western grape growing, wonderful results are possible with the large berry and large bunched varieties, such as Moore's Early and the Worden, as well as the Concord. There is great room for the opening up of good special markets with extra grown grapes in the West.

The presence of spiders among the vines is helpful, as they destroy many insects that work on the fruit and puncture, and thus admit of bees working on the grapes. Spiders are very numerous on the vines during gathering time.

The Concord, as a rule, should be left very late on the vines in order to make it do its best. If rully ripened it has a high and refreshing taste and flavor. The fear of first frost generally frightens most people into gathering the Concord before it is fully ripe.

The culture of the vine dates back to the beginning of history and even before. It is a child of the sun, and like the peach, is only thrifty when grown under excessive heat and with proper time to mature wood in the fall. Ground with its soil not too heavily charged with humus is its proper location. The vine, like any garden crop, needs cultivation all summer, and it should be shallow. Grape growing has unfortunately been injured by booms. After these subside the crop brings a profit and the boomers and their victims are weeded out by their indifference to the vine culture. After a few propagators have unloaded a few cellars full of nursery stock, their booming propensities have to seek another outlet.

Grapes should be planted in the spring. They may be planted in the fall, but a considerable heap of earth should be piled over each vine to prevent killing out. If the ground is very dry it is unsafe to transplant in the fall.

The appearance of grapes is soon spoiled if they do not reach the consumer at once. After packing the stem goes down quickly, the bloom deadens, and the baskets become a dark, dingy, sunken mass.

If they reach the consumer in from three to six hours, and salesmen sell with the lids removed, using several baskets in each hundred for heaping the others with bunches, artistically arranged, they go quickly, and a nickel higher per basket. There is much in the expression "fresh fruit," when applied to grapes, as will be found after they reach the consumer at once after gathering.

Grapes suffer from lack of rain, but they do so less than other fruits. Like the peach, they can endure a great deal of drouth, but 1895 injured many vineyards, and it took some two years to fully recover from the damage. The damage did not occur in the summer season. The drouth left us little moisture in the ground, and the evaporation during low temperature in the winter following exhausted the vines and killed the entire tops, and very often the roots as well.

A good lot of vines and a vineyard well cared for will last from twenty-six to thirty years. During the last twelve years the vines will need more care than when younger. They can be revitalized by fertilization with slaughter house refuse and wood ashes.

Cuttings for growing new vines should be taken as soon as the leaves drop. They should be buried just frost deep, with the butts up, until May first. They should then be buried in the same position, within five inches of the surface and well raked and watered for a week. They should be stuck in the ground in rows with the large end down and the top of the cutting even with the surface. They should be well cultivated, and the cutting rows should be covered with earth for the first ten days.—*Live Stock Indicator.*

DOES IT PAY TO SACK GRAPES ?

Since writing on this subject in a recent number, I have been asked this question. Now that will depend. With grapes at one cent a pound when grapes are for sale, no. If, however, you live in the city and are limited in vines, yes. Now, I live in the town and have about two hundred vines, more than necessary for the table, and hardly enough to bother with to sell. We have on our farm five acres of grapes. In looking over the latter they are free from injury and can be cut with no necessity of overlooking the bunches. While here in town fully twenty-five per cent have been injured by birds, and every bunch not sacked requires attention ere it goes into the basket. Thus fully two men's work is necessary where one would be if not for injury by birds. I am satisfied I could have sacked the grapes for the additional labor required to prepare for market, as an active hand can sack 1,000 bunches per day, or say 1,000 pounds. Then the twenty-five per cent of loss would much more than pay for sacks. Then the grapes would be in better form, not only larger bunches, more improved in appearance, more highly colored, skin more tender and would be worth more in the market.—*West Fruit Grower.*

TRAINING GRAPE VINES.

E. G. Lodeman, Department of Agriculture Report:—Training, on the other hand, is almost wholly a matter of convenience. It does not affect the strength of the vine, or the value of the crop in any essential particular. The training of a vine refers to the disposal or arrangement of the various parts of the vine after pruning has taken place. The method of training adapted determines the operator to leave certain growths in certain positions, not because more or better fruit is expected, but for the reason, perhaps, that the fruit may be harvested with greater ease, that a laborious operation may be wholly dispensed with, or that there may be less danger to the maturing crop from winds or other natural agencies. The method of training adopted by a vineyardist is largely the result of personal preference or of education, although soil and variety are important factors in the selection of a system. The health and vigor of the vine are rarely affected by the method in which it is trained, and although some system of training must be adopted in every vineyard, still altogether too much weight has been laid by most Horticultural writers upon the peculiar merits of the various systems, while the actually ruinous effects of bad pruning have not always been sufficiently emphasized. A vine properly trained is desirable, but a properly pruned vine is essential to the highest success. The importance of this subject necessitates a somewhat detailed statement of the principles which are vitally connected with the proper pruning of the vine. These principles serve also as the foundation for all systems of training, and they can not be ignored without more or less injury to the plants.

(1) The amount of fruit which a vine can bear and mature in highest perfection is limited; when this limit is exceeded the fruit deteriorates.

(2) Upon the fruit the effect of overproduction is to reduce the size of the berries and of the clusters, and probably also to impair the quantity;

the vine makes a poor growth, the foliage is small and the vigor of the plant is generally reduced. When a vine has been allowed to overbear, especially when it is young, years may sometimes be required before the vine returns to its normal condition.

(3) A plant that is carrying less fruit than it is capable of maturing generally produces a very heavy foliage and an excess of wood. This may probably be explained by the supposition that the energies of the plant are directed almost entirely to vegetative activity.

(4) The most difficult and important feature of grape pruning is to be able to judge of the kind and amount of wood which should be allowed to remain upon the plant. This amount is dependent upon soil, variety, climate, character of the season, and to a limited extent upon the method of training. The paramount importance of having a properly balanced top and root system is most fully realized by American vineyardists of long experience. Years of study, especially the study of the variety of grape and of the soil upon which it is growing, are brought to bear upon each individual vine when it is pruned, and in no direction can the skill of the vineyardist be more clearly demonstrated than in questions regarding the amount and kind of bearing wood that is allowed to remain. No rule-of-thumb will cover a living and sensative organism for the grape vine; in pruning judgment must be exercised at almost every step. But it is fortunate that considerable variation may be allowed without serious consequences or the profitable culture of the grape would indeed be a hopeless task. Yet the less the reliance placed upon this allowed variation, the better will be the vine.—*Farmers' Review.*

GRAPE GROWING IN MISSOURI.

In planting a vineyard the first thing to consider is the location. Although a grape vine will grow anywhere, we prefer a good elevation with an eastern slope, so as to get the full benefit of the morning sun. Prepare the ground by plowing once each way, then harrow till as smooth as possible. Mark off the ground by driving stakes ten feet apart each way, leaving them four feet out of the ground. We now select strong one-year-old vines, 75 per cent of which, at least, would be Concords. Cut off all top except two or three buds, and shorten the roots to ten inches. Plant by leaning the top against the stake. Spred the roots well over a fresh-dug hole that has been dug fan shape on the up-hill side from the stake, and large enough to avoid any cramping of the roots; the hole should be ten inches deep at the outer edges. Tread well while filling in.

We now have but one object in view; that is, to grow a vine that will be able to fill with credit its mission in life, which is to produce for us as much choice marketabe fruit each year as possible. To do this it must be kept in complete subjection, for we find nothing in the orchard quite so ambitious as the grape vine in making preparations for its next year's work, using every effort to produce an enormous fruiting surface, only to be cut off and thrown away at the winter's pruning. It is strength instead of length we want in our canes, and to have this in its highest perfection it is necessary to store up as much of the vital forces of our plant as possible, where it may be best used in the future. When the buds we left on our newly planted vine have grown enough for us to see which is the most promising one, it is carefully tied to the stake and we pull off all other growth. Keep this chosen cane tied to the stake throughout the season. The hoe and cultivator may thus be more successfully used, with no danger of destroying the young plant. At the close of the first season as soon after the leaves have fallen as convenient, prune the vine so it will be ready, when the warm days come, to begin its second year's work.

Do this by cutting back so as to leave only three buds of last year's growing. Start the cultivator soon as young leaves are in sight and do not try to economize by cultivating less than four times each way during the growing season. Keep a close watch for those three buds we left last fall. Choose the finest again and tie to the stake, pulling off the other two; also destroy all preparation for fruit. Keep this cane well tied until it reaches the top of the post, then pinch off the end, as it is high enough for this year. In a short time laterals will form. After making two or three leaves, pinch off the ends, as this causes the cane to broaden out. You have now, at the end of the second season, boxed up in a cane four feet long, the same amount of vital force that, if allowed to grow at will, would have produced three canes eight feet long, only to be cut off and thrown away. In the next winter's pruning, leave fifteen buds. This gives you at least a fruiting surface of forty bunches. We now start the third year.

Soon as buds begin to swell, spray, or rather give vines a good drenching, using ten pounds of Sulphate of iron (Green Vitrol) to fifty gallons of water. Do not use this spray after buds are open. Start the cultivator and use liberally, as we expect the vine to do double work this season. Grow a new cane, starting near the ground, and treat the same as the one last year, by keeping it tied up. We shall need more room for fruit after this year. There are two canes to train now instead of one, and the one that is fruiting must not be neglected, or if will try to do too much again. As soon as two leaves have formed beyond last bunch of grapes, pinch off the end of the shoot. This will cause the laterals to start again. Pinch those as soon as beyond second leaf. This summer pruning increases the size of clusters, as well as making large wood for future use. Spray the second time soon after bloom has fallen and repeat twice more during the summer, using Bordeaux mixture, adding Paris green. Use an elbow next to the nozzle as this allows the spray to reach the under side of the leaves, where it is most needed. At the end of third season there are two strong vines ready to fruit and it will be necessary to replace the small stakes with heavier ones five and a half feet above ground. Follow this system until you have three canes running to top of stake, which if properly cared for, will be plenty of surface to grow all the fruit your vine is able to mature.

West Fruit Grower. GEO. COMLEY, Howell County, Mo.

CULTURE.

ASHES IN AN APPLE ORCHARD.

S. A. Beach, Horticulturist at the Geneva, N. Y., Experiment Station, has been conducting experiments with wood ashes to prevent apple scab. These experiments were undertaken in harmony with the oft-expressed belief that the use of fertilizers which kept a tree and foliage in perfect condition rendered them practically free from the influence of fungus diseases. The use of ashes did not render the fruit immune from disease, but satisfactory results were obtainable in the color of the fruit, and the keeping qualities of the same.

The summary of the results is as follows:

In an experiment including 124 trees in full bearing, and continued for five years, liberal applications of hard wood ashes did not increase the immunity of apples from the scab. With few exceptions, the varieties on treated sections yielded larger percentages of scabbed fruit than those on untreated sections.

On the treated sections of the orchard the foliage in many cases was improved, but it can not be said that the improvement was due to increased immunity from the scab.

Where the ashes were used the color of the fruit was much improved in some seasons with some varieties, but a season very favorable to the perfect development of the fruit none of the varieties showed any improvement in color as compared with the same varieties on untreated sections.

Apparently the use of ashes had a general tendency to hasten the perfect development of the fruit. When the season was not especially favorable to the perfect development of the fruit it improved the keeping quality, but in a season very favorable to the perfect development of the fruit the ripening processes were generally carried so far where the ashes were used that the apples did not keep so well as where no ashes were used.

The yield, except with the Baldwins, was greater on the treated sections, but the data are not such as make it safe to draw definite conclusions as to the effect of the use of ashes on the yield.

Decided differences were shown between varieties as to the ability to resist scab, and preliminary investigations indicate that this difference in resistant power is correllated with structural peculiarities.—*Western Fruit Grower.*

NATURE'S METHOD OF FERTILIZING.

It is surprising how little the hints that nature gives as to the best methods of securing soil fertility are heeded by the ordinary farmer. In a general way all arable soil may be said to be the result of the growth of plants. Freshly disintegrated rock is generally quite unfertile. Kindly nature takes up the process just where the sun and rain and frost have left it. Some form of scanty vegetation comes, then decay, then more plant growth, more decay, until finally the broad forest with its deeply rooted sources of nutriment, its annual leaf-fall, finally turns barren rock dust into fertile soil. This is nature's method of manuring. It is thus that available plant food from the deep underlying layers of subsoil are brought to and concentrated upon the surface.

But trees and deep-rooted plants not only pump up from below a vast store of already soluble plant food, but they are directly concerned in its increase. Even the most tender rooted, from the acids which it secretes, is able to bore its way into the disintegrating fragments of rock and thus liberate and bring to the surface nutriment, which would otherwise remain securely locked up. In this way vegetable life becomes the active instrument of its own increase. It will thus be seen that when left entirely to nature's handiwork the tendency with all soils is to constantly improve.

The more closely we follow nature's ways in our methods of fertilization, the more certain we are to be on the right track. A soil covered with vegetation, whether growing crops or grass or even weeds is, other things being favorable, an improving soil, while one kept barren of vegetable growth either by plowing or otherwise, is either stationary or retrograde in fertility.

Artificial fertilizers in the hands of an intelligent farmer will not be used merely to obtain a single crop. Everything should be directed with reference to permanent soil improvement. Remembering what has been already said as to the role which vegetation plays in natures's method of manuring, it will not be at all difficult to combine the two. All progressive agricultural authorities are now urging the use of clover, cow peas, and other similar leguminous plants, heavily fertilized when necessary with Potash and soluble phosphates, as the only practicable plan of securing simultaneous soil and crop improvement.

Fall fertilization is, of course, often advisable in the case of fruit trees, and in the lower Gulf States, where winter gardens are practicable, it is of course imperative. Indeed, the earlier these things are attended to, the better the results. If the progressive Horticulturist has taken care to have his ground covered by a heavy summer growth of cow peas or some other equally effectual gatherer of Nitrogen and Humus, he occupies a distinct vantage ground. The problem of fertilization is greatly simplified. He can probably stop buying Nitrogen and pay out his good dollars for Phosphoric acid and Potash. Neither of these fertilizing elements are likely to waste, and after the summer rains have ceased, the sooner he gets them incorporated with the surface soil the better. For this purpose a harrow is superior to a plow, and some form of light cultivator better than either.—*Southern Planter.* NORMAN ROBINSON.

WATER WITH THE RAKE.

The subject of watering plants and vegtables in the garden is one in regard to which a good many people should reform their practice. Prof. L. H. Bailey of Cornell University believes in "watering with the rake" as much as possible. In one of his books designed for use in the common schools and therefore written in language adapted to the understanding of children, he says:

"I wonder if you have a watering pot? If you have, put it where yut can not find it, for we are going to water the garden with a rake! We want you to learn, in this little garden, the first great lesson in farming—how to save the water in the soil. If you learn that much this summer, you will know more than many old farmers do. You know that the soil is moist in the spring when you plant the seeds. Where does this moisture go to? It dries up—goes off into the air. If we could cover up the soil with something, we should prevent the moisture from drying up. Let us cover it with a layer of loose, dry earth! We will make this covering by raking the bed every few days—once every week, anyway, and oftener if the top of the soil becomes hard and crusty, as it does after a rain. Instead of pouring water on the bed, therefore, we will keep the moisture in the bed."

But the rake only conserves moisture; it does not create it, and when watering must be done, he goes on to tell how to do it, as follows:

"If, however, the soil becomes so dry in spite of you that the plants do not thrive, water the bed. Do not sprinkle it, but water it. Wet it clear through at evening. Then in the morning, when the surface begins to get dry, begin the raking again to keep the water from getting away. Sprinkling the plants every day is one of the surest ways to spoil them."

MULCHING TO KEEP DOWN WEEDS.

The labor of the farm might be lessened considerably if mulching was practiced when it is possible to do so instead of cultivating as is the usual custom. There is no better plan to keep down weeds than to use the mulch when it is at all practicable, and some crops do well if grown under a mulch applied at the right time and in the right way.

Upon most farms there is always an abundance of wheat straw that can be utilized when we begin the work of mulching. In the absence of straw we may have refuse corn fodder, clover haulm or even thrashy manure that can be used. We use straw for the reason that we think it best of all material found on the farm and most abundant. In many instances the farmer is at a loss to know what to do with his straw, and in many instances it is burned to be rid of it. We would never burn straw in any instance and especially not until we had mulched everything we possibly could on the farm. When there is nothing else to mulch try it on those poor points of the farm and get your fields rich all over alike.

Several loads of straw may be used each year about the fruits that are grown for other than home consumption or the market. We find that it is much better to mulch the raspberries, blackberries, currants and gooseberries than to spend time cultivating same and cutting out the suckers between rows. It requires but one good mulching to keep things in good shape for the entire year while the cultivations must be frequent and thorough to do the work right. The mulch between rows of small fruits should be of sufficient depth that weeds will not sprout through. This mulch is also very convenient at time of picking fruit as the straw keeps fruit from becoming muddy when in hangs low down, and it never is muddy under feet. There is no easier or better plan to grow potatoes for home use, or even in a small way for mrrket, than by mulching. The finest and best potatoes we ever had were grown under straw. This mulch should be applied when the potatoes are well through the ground and should be put on the depth of five or six inches. You need then have no fear of drouth and your vines will be so vigorous that bugs and blight will not damage as rapidly.

Tomatoes should also be heavily mulched when set out, and no sticking will then be necessary. Such garden crops as are usually cut short by droughts in the fall can be kept in good shape by mulching.

During the past season we tried mulching pole beans, bunch limas, and late cabbage and had excellent results therefrom. It was particularly beneficial to the bunch limas. It kept the pods off the ground and they did not rot as badly as they had done for us in previous years. It will only require a few hills of pumpkins planted now and well mulched to produce all that are needed for home use, and the crop will be a sure one, no matter how dry and unfavorable the season.—*Farmers' Guide.*

The Agriculturist must not ask his land to give him crops year by year, without rendering to it a return for its bounty. If you want your soil to be liberal, you must make it "fat." The farmer, in his dealings with his fertile acres, can not always be simply beneficiary; he must all the while be a benefactor also. The product of the soil must in some measure be returned to the soil if its fruitfulness is to continue. There are farmers who "skin" their land by constant cropping and no fertilizing; but it is ruinous economy for the owner, and a grave wrong to the community; for whoever reduces the wealth of the nation's soil and the sources of the supply of sustenance is guilty of unsocial conduct.—*Washington Gladden.*

The government of Argentina expended $4,000,000 this year in fighting locusts.—*Rural World.*

MARKETING.

ABOUT FRUIT PACKAGES.

An "act to define the size of certain fruit packages," as proposed by the society, is as follows—condensed:

Section 1. Peach baskets—standard size to be 13 inches at top, inner diameter; 8½ inches at bottom 10⅛ inches at middle, with stave 12⅜ inches long; to contain when even full 1075.21 cubic inches. The half or pony basket to be 10½ inches at top, inner diameter; 7½ inches at bottom, 8⅝ inches at middle; with stave 8½ inches long; to contain, even full, 537.6 cubic inches.

Sec. 2. All makers of such baskets in this state shall mark, in inch Roman letters, on outside (no bottom) of each basket, "Standard 16 qts.," with their name and place of business; on each half basket—"Standard 8 qts.," with name and address.

Sec. 3. Grape crates—Standard size to be 26 in. long, 11 in. wide, 11 in. deep, inside measurement; to contain 8 baskets or tills to hold 5 lb. of grapes each. The half crate shall be 23 in. long, 10 in. wide, 7¾ in. deep, inside measurement; to contain 8 baskets or tills holding 2½ lb. grapes each.

Sec. 4. Manufacturers of crates to mark (as above) the words "Standard 40 lb." and "Standard 20, lb.," with address.

Sec. 5. Standards of measure for buying and selling all small fruits shall be the quart containing 6.72 cubic in.; the pint, 33.6 cubic in., and the ½ pint, 16.8 cubic in. Inside measurement of qaart basket to be 5⅝ in. on each side at top, 4¼ in. at bottom, and 2⅞ in. deep. The pint basket shall be oblong, 5 by 3⅛ in. at top, inside; 4 by 2⅜ in. at bottom. and 2⅛ in. deep. The half pint basket to be 3⅛ in. on each side at top, 2½ in. at botton, and 2 in. deep—inside measurement.

Sec. 6. Crates or packages containing quarts, pints and half pints to be marked "Standard qts.," &c., with number of baskets or boxes contained by the manufacturer.

Sec. 7. Any one selling peaches in baskets of size not provided for in Sec. 1; or not marked as in Sec. 2; or who sells grapes in crates not of size and capacity provided for in Sec. 3, or not marked as in Sec. 4, or that are short of net weight marked: or who sells small fruits in packages of size not provided for in Sec. 5, or in crates not marked as in Sec. 6—shall be guilty of misdemeanor, and if convicted shall be fined not less than $5, nor more than $25, and stand committed to the county jail until fine and costs are paid. In selling a lot of five or more crates or half-crates of grapes, if average net weight equals or exceeds 40 lb. in one and 20 lb. in the other, the fact of one crate being short of standard weight shall not be considered a violation of this section.

Sec. 8—Provides that all manufacturers of baskets, crates, &c., who sell or dispose of any not of standard size or not properly marked, shall be deemed guilty of a misdemeanor, and subject to a fine of not less than $25, or more than $100, and stand committed to the county jail until fine and costs are paid.

Sec. 9—Permits selling of grapes in packages differing from standard crates or half-crates, provided net weight is marked in inch letters on the outside. Penalty for selling unmarked, same as in Sec. 7 for each package sold or offered.

Sec. 10. This act to take effect Jan. 1, 1899.—*Country Gentleman.*
Hudson Valley Society.

WHAT THEY SAY.

Kevitt's Fruit Wrappers.—We have often spoken of T. C. Kevitt, his strawberry business, and his method of wrapping strawberry boxes. After the box has been filled with fruit, a piece of waxed or parchment paper is wrapped around it, as shown in the picture. This keeps out all dust and dirt, and gives the fruit a very neat appearance, and when customers have becomeused to this wrapped box, they appreciate its advantages and are ready to pay extra prices for it. Where one has a choice lot of berries to be sold in a nearby market, this method is well worth trying. The best customers like clean fruit, and they soon come to realize that the neat paper wrapper keeps out dust and dirt.—*Rural New Yorker.*

SHIP WHEN FRESH.

How often will shippers be told to send on consignments when the goods are ready for market, or, in other words, when fresh; instead of this they hold off a lot so as to get a carload ready at one time.

This is a mistake. By the time a carload is ready, a good portion of it has been gathered for several days, and has taken on a "smutty" appearance, if not already showing signs of decay. When the goods arrive in market the fresh goods are "handicapped" by the older goods and the general average price of the car considerably reduced. When handling perishable goods, "delays are dangerous," and the sooner you conclude to ship when fresh, the sooner you will have an account on the right side of the ledger.—*Fruit Trade Journal.*

MARKETING FRUITS.

This subject has been handled so often heretofore by practical men and good writers that I do not pretend to offer anything new, and I shall only aim to emphasize some of the best suggestions that are known to most fruit growers. No one will deny that handling or marketing constitute the most important features of the labor connected with the industry. Mistakes in the picking, packing and marketing may lead to the loss of the crop and all the labor bestowed on its production.

The hot contest for existence now in any line of business calls for the best efforts of those who wish to excel or make a good living. The further a man is from the market the greater the need of being an expert in picking and packing fruits for distant markets. The wants of the local markets are understood by all and it is unnecessary to dwell here; but commercial fruit growing, as a rule, means shipping to distant markets, so their wants must be known and satisfied.

The model packers are the Californians. Necessity was the mother of invention in their case, and their methods in picking and packing and marketing are the best examples before us. Situated as they are, from 2,000 to 3,000 miles from their principal markets they are forced to study deeply every feature essential to success. As shippers they have to compete with every fruit growing state in the Union, for they go into all the big markets and secure patronage on the merits of their products.

Admitting that the trees or orchards have received that care they are entitled to and necessary to produce choice fruit, the picking of same calls for the exercise of the greatest care and precaution. The slightest bruise, which is hardly visible when leaving the shipper's hands, shows up at destination an ugly blotch, a discolored spot in which decay has sometimes set in. The sale of the package is already seriously damaged. If the packages are roughly or hurriedly handled, as is often the case, the situation becomes much worse. If a shipper had the time and means to spare to visit his market while his fruit was coming in he would realize the force of these remarks and often acquire some valuable pointers.

There is a needed tendency towards smaller and neater packages for fruits. In addition to getting nearer the wants of the consumer the fruits are not subject to the injury they are exposed to in large packages, where the ripe are crushed by the greener ones. A light, attractive package helps to no small extent in the sale of the contents. The cost of packages is no longer a big expense. The decline has kept pace with the decline in values of fruit, and new and improved machinery insures still lower prices for many of the packages necessary.

Conceding that the grower has done his duty so far in raising, picking and packing the fruit, the next step is the best market, and last but not least, the firm selected to ship to. The alluring and neatly worded circulars have lead many a shipper astray. Big figures too often prove a bait that many cannot resist. Every big market has plenty of firms who are entirely satisfied with their legitimate commissions to whom the grower can ship without assuming any risk. Beware of the big windy circulars that promise everything and the firms that send them out.—P. M. KIELY.

PROPER WAY TO PACK APPLES.

We will take the barrel as the standard package for use in storing apples, but the writer firmly believes that in the near future the bushel box will be used quite extensively for storing the better grades of apples for late keeping. The barrel should be made of number one staves, heads and hoops, the face and head lined, top and quarter hoops nailed with three-fourth-inch cut nails before going to the orchard; never use a wire nail. Our experience has taught us that apples hand picked from the tree and carefully placed in the barrel ,show best results. Apples thus packed show their bloom better and show a life or freshness that apples which are run over a table or laid on the ground for a time before going into the barrel, do not have. When you please a buyer's eye the sale is half made.

We believe in double facing, using apples as nearly one size and color as possible, and to have the face apples represent the remainder of the barrel in size near as practicable. Shake the barrel gently after each basket is emptied until the barrel is filled. Some varieties will stand filling three inches above the chine, others not so much; right at this point is where great care is needed. Apples properly filled in the barrel and an experienced man with a press can add very much to the keeping and selling qualities of the apple. How often do we find from eight to twenty or more apples badly bruised on the bottom, caused by too much pressing simply a waste and loss, and frequently a barrel will shake and the dealer must use a like quantity to plug or fill the barrel before sending out to a customer. With proper care in barreling and heading all this extra work and waste of apples would be avoided. Shake well and level off the face before putting in the head, then nail and headline carefully. It takes a little time, but one barrel to burst open in a car will cause more loss than the extra labor spent in securely nailing the bottom. A careful packer will put a private or distinguishing mark on an extra fine colored barrel, that will frequently bring his employer an additional 50 cents or $1.00 from stand buyers who want quality, and the same plan followed by marking an off barrel will assist the salesman materially in satisfying his trade who wants a lower priced apple.

We prefer to load apples on car same day as picked, and find apples placed in storage soon as possible after packing keep better than when they lay on the ground or are stacked up in piles under trees or alongside station and exposed to rain or sun. The question on what day to begin barreling for storage is frequently asked; our rule when seeds are black, apples pull fairly free from the limb with the short stem remaining in the apples, even if the proper color is lacking. And above all use only a standard sized barrel, the package recommended by our association, and make three grades of apples, firsts, seconds and drops. The apples that drop while picking are often the largest and best colored but should not be put in with the fruits for storage, even if they fall on soft ground or grass; the fall injures them even if skin is unbroken, they will show dead color in a few weeks and injure the sale. The header should use care in marking plainly the variety and face end of each barrel to save the salesman much annoyance and labor.

If our association could adopt such measures as will lead to careful picking and honest packing apples, it will receive the praise of the entire fruit trade of the world.—L. K. Sutton, Columbus, Ohio, before the National Apple Shippers Convention.

The shipper who "ties to" a reliable commission house, "takes no stock" in the somebody who quotes higher for a short period, in order to catch him, and who goes right along making regular shipments—high or low market—will find his average price higher for the entire season, than the one who ships to anyone, at any time, in "fits" and "starts," depending upon all sorts of advices. The last man alluded to may realize much higher prices on the first few shipments—but, oh, my! Let him figure up the season's results, and he will find the net proceeds about equal to the cost of a half ton of fertilizer or a month's wages for one of his farm laborers.

The common mistake of shippers dividing their shipments between two or more commission houses in the same city has been the subject of debate and comment before the annual meetings of the National League of Commission Merchants of the United States, and is one demanding the attention of shippers. Of course, it is natural, for a shipper to learn which house is getting the best prices or makes the returns most promptly and honestly. But such a division secures no test at all. Each house receives a lot so small that it cannot afford to pay attention to it while larger lots of regular shippers await their attention. The small and transient lot may find a good buyer one day and a poor one the next. All depends more or less upon chance. The regular shipper receives more consideration, and why not? His goods must be sold at fair prices if buyers can be found, as his patronage is large enough to be worth something to the house. The small shipper is at a disadvantage, but the wise one learns to make the most of his chances by sending all his products to a single firm, and impressing upon that firm the fact that he is a regular patron year after year. He makes his patronage worth all that he can to the house by dealing with it only, and in turn the house learns to push the sale of his goods and let the shipments of transients wait until he is cared for. Producers must realize that the commission merchants are very human and are business men, and they will always take care of their best patrons first, and while they may try to treat unknown transients all right, they are going to push the sale of regular patrons' shipments first, in order to hold them. It therefore pays to give one good house in a market your entire shipments for that market.—*Fruit Trade Journal.*

A GROWER'S VIEWS OF THE COMMISSION MERCHANT.

In writing his experience with the commission merchant, T. Greiner writes in Farm and Fireside.

While Mr. Greiner's advice is true in many respects, his opinion of the commission merchant is largely overdrawn, and is confined more to a local business than otherwise.

We must also take exception, in the first place, to his statement that "consigning goods is a somewhat expensive method of selling." The cost of transportation and handling is the same, whether the grower sells the goods or the commission merchant, with the only difference that when sold by the latter a commission is charged. For this commission there is always a better price realized.

As to the dishonest commission merchant, that can not be gainsaid. If a producer "ties up" to the class mentioned, he alone is to blame for any losses he incurs, especially when an organization like the National League of Commission Merchants of the United States, invites him to accept its system of protection against a class of "commission swindlers."

If Mr. Greiner was disposing of fruits and produce belonging to others besides his own, he would find his methods would have to be considerably altered to conform to business principles which afford a profit. The fact that he occasionally has a wagon load or two, and is within hauling distance of a prominent market, gives him an advantage which thousands of farmers do not possess.

We agree with him that the commission merchant whom the grower selects should be honest: should be a good salesman, and have good judgment, and when such qualities, combined with capital to handle the business, are in the possession of individuals seeking trade, the sooner the producer gives them consignments, and sticks to them, the sooner he will be rewarded for his labors.—*Fruit Trade Journal.*

INSECTS, DISEASES AND SPRAYING.

INSECTS AND GERM DISTRIBUTION.

Dr. Berlese, an Italian scientist, having observed that in fissures on the bark of forest and fruit trees the cells of yeast occurred, suspected that ants were the chief agents in disseminating the plants. Experiments subsequently made indicated that when the ants came from a vineyard, and the material in closed vessels was ordinary soil, or bark from vines or vine poles, the organisims conveyed to sterilized grapes in another receptacle and to sterilized material in a third vessel, consisted chiefly of two specimens of yeasts and moulds. When the bark came from living trees, no yeasts were observed, but moulds were abundant. It also seems that various kinds of flies, like the blue meat fly and the viengar fly, convey not only yeasts and molds, but that the latter conveys a fungus (Dematium) and the vinegar ferment (Bacillus aceticus). How do these winged flies convey these plants? It was shown that they are often more abundant in the bodies of the flies than on the legs and feet. When flies were fed grape must, and the organisms ingested, the excreta contained large numbers, much larger than the flies had received in their food.

These organisms multiply in the crop, which communicates with the oesophagus at the upper part of the digestive tract. The crop contains a syrupy liquid in which these yeast cells multiply. The experiments referred to show that insects are important factors in conveying organisms internally rather than externally and that the orgrnisms are not conveyed by currents of air. This recalls the experiments made by M. B. Waite, of the department of agriculture, demonstrating that the insects which pollinate the flowers of the pear also distribute the pear blight organisms.—*Live Stock Indicator.*

SPRAYING KILLS BEES.

A resolution was passed asking for a law that should prevent spraying of trees when in bloom, because of the destruction of honey bees by so doing. It was urged by many that large apiaries had been almost destroyed by this foolish and evil practice, and in the face of the fact that the bee is a great help to the fruit grower by aiding in pollination.

R. N. Yorker, West N. Y. Hort. Soc.

SPRAYING.

The Canadian fruitgrowers of Ontario held their thirty-seventh annual meeting in December at Waterloo. There were many subjects discussed, and ably discussed, but the paper on spraying was practical and elicited much discussion. It above all others would interest us, as it brought out the idea of winter spraying which is well for our fruit growers to consider. Believing its importance is worthy of the space we give it below, we invite your careful consideration.

Mr. W. M. Orr's report on experiments in spraying fruit trees was a most instructive one. Experiments were conducted in twenty-nine orchards, in twenty-three counties. The Bordeaux mixture was generally used.

The results attained were very satisfactory, in some cases the full 100 per cent being obtained, in others the results were not as good because of rain falling immediately after the spraying was done. As showing the benefits of spraying Mr. Warner's orchard, at Trenton, is a good sample. The percentage of clean fruit is as follows:

	Sprayed,	Unsprayed.
Northen Spy	76	8
Snow	75	0
Wealthy	90	20
Baldwin	90	10

The spraying of twenty-five trees in Mr. Warner's orchard increased the value of the fruit to the extent of $100. In another place sprayed Maiden's Blush sold for $4.00, and unsprayed for 75 cent a barrel. Spraying certainly increases the percentage of clean fruit, the specimens are also larger, brighter, better flavored, and of superior keeping qualities. Cost of spraying is about two cents per tree.

Professor Fletcher said 90 per cent of the spraying was not done as it should be. To be successful a nozzle was required that would make a fine spray. Many of them made coarse spray that did not answer. There was a difference between spraying and drenching a tree. We must give more attention to spraying. Some men say they have no time for spraying. In answer, he said, you may just as well say you have no time to make money. Spraying only costs a few cents a tree, and as illustrating the profits, in addition to the one given above, he gave another. A man sprayed twenty-nine trees, and it was worth to him this year $75. The simple reason why so many people will not spray their trees is that they are lazy. There is no danger of poisoning the apples if the spraying is done at the proper time. The apple can not absorb the arsenic of the Paris green. Anyway, if the poison was absorbed it would quickly destroy the apple. If there was any arsenic on the outside of the fruit it is in so small a quantity that it cannot be seen with the naked eye, a good lens would be required to see it. The statement made by some people that the buyers will not buy the fruit if they know it to be sprayed is only an excuse to cover laziness.

The discussion of Mr. Orr's paper was continued at the afternoon session. Spraying during the winter was advisable, as then all the spores on the twigs could be destroyed. It can be done any time during the winter when most convenient, but the best time is towards spring, when the vitality of the tree is reviving.

Professor Taft, of Michigan, strongly advised spraying during the winter, for during the summer new leaves are constantly coming out and spraying would need to be done constantly to keep all the leaves sprayed. He recommended spraying the gooseberry for mildew three or more times; first, before growth started, use Copper Sulphate solution then; second, when the leaves were half opened out; and third, when the fruit was set. The latter applications should be the Bordeaux mixture.—*Mountain Fruit Grower.*

KEDSIE'S SPRAYING MIXTURE.

The spraying mixture formula by Professor Kedsie of the Michigan Agricultural College is as follows:

Boil two pounds of white Arsenic and four pounds of Salsoda for fifteen minutes in two gallons of water. Put into a jug and label "poision," and lock it up. When you wish to spray slake two pounds of lime and stir it in forty gallons of water, adding a pint of the mixture from the jug. The mixture in the jug will cost forty-five cents, and this is enough for 800 gallons or twenty barrels of spray. These twenty barrels will require forty pounds of lime, which will cost twenty cents more, making the total amount cost sixty-five cents for twenty barrels, or two and one-fourth cents per barrel.

It is claimed that the above mixture is better than the Paris green as there is no danger of burning the trees, and is less expensive. It has gained an excellent reputation among the eastern fruit growers.—*Arkansas Fruit Grower.*

HOW TO DISINFECT PRUNING INSTRUMENTS.

W. H., Vineland, N. J.—I feel satisfied that yellows has been carried by trimming in my peach orchard; I would like to know what to use to disinfect the cutter after using on each tree.

Answer.—Several different substances may be used for disinfecting pruning instruments; probably the best material, all things considered, is a strong solution of carbolic acid. Carbolic acid may be obtained at any drug store, and the best form is the crystalline acid. If the acid is shaken up in a bottle with water, a saturated solution can be made which contains about five per cent of acid. In using this carbolic-acid water, it is desirable that a sponge or piece of cloth should be fastened inside the bucket or vessel used, and the knife should be wiped against the sponge or cloth, which is saturated with the solution. A solution of ordinary chloride of lime is a good material for disinfecting, about two to three per cent being the proper strength to use. Corrosive sublimate (mercuric chloride) is a powerful disinfectant, and could be used for this purpose. A solution containing one tenth of one per cent would be amply strong. There are corrosive sublimate tablets for sale at drug stores, each tablet containing the proper amount for a quart of water. In this form, they are very convenient to use. As to the possibility of communicating Peach yellows from one tree to another by pruning instruments, I think that very conclusive evidence would be necessary to prove this fact. Dr. Erwin F. Smith (see bulletin No. 1, Division Vegetable Pathology) has found, in the course of his extensive experiments, that Peach yellows can be reproduced by budding, but when the buds fail to unite with the stock, the disease is not communicated. This seems to be very strong negative evidence that mere contact of the diseased material is not sufficient for inoculation.

M. B. Waite, Assistant Pathologist U. S. Department of Agriculture.

Prof. Paddock read his report on Botany and Plant Diseases. He called attention to a new disease of the black raspberry, locally termed "black blight," which has been reported in several localities in Western New York. The first noticeable symptom is the drying up and blackening of the leaves. Further examination will show that much of the cane has become black; discoloration extends as the disease advances. Specimens were submitted to Mr. F. A. Woods of the Department at Washington, who is of opinion that the disease is caused by a fusarium and that it probably gains entrance through the roots of the plants and possibly through injuries to the crown. If it be true that infection takes place at the root, the only remedy that can be recommended is to dig out and burn the diseased plants. It is known that the disease spreads rapidly; therefore its appearaace should be carefully watched for and infected plants promptly destroyed when found. Prof. Paddock then referred to a new disease of the apple, which is attracting attention in Western New York, is particularly severe on the Twenty Ounce, and has been observed to be quite destructive to this variety in the vicinity of Rochester and Brockport. It occurs also in Pennsylvania and typical specimens have been collected at Still Pond on the Eastern Shore of Maryland and in the James river country of Virginia. In the south the principal damage is done to the Early Harvest variety. The disease may be roughly described as consisting of dead spots or wounds, usually the size of a man's hand or larger, which occur on the trunks and larger branches of apparently otherwise healthy trees. The first indications observed consist of small sunken spots a half inch or more in diameter which do not penetrate through the bark at first but finally reach the cambium and spread outward from the center. The spots often start on the forks and rough places on the bark, as well as on smooth places; they seem to have an indeterminate growth, rarely extending more than six to twelve inches. Occasionally branches, three inches or more in diameter, are girdled by the spot and killed, and others are greatly injured by more or less complete girdling. More commonly however, the spot, after spreading a few inches, ceases to grow and the bark falling off leaves the wood exposed in an ugly wound which becomes deeper each year as the wood grows under the live bark around the edge. If the branches were kept well sprayed with Bordeaux mixture two or three times annually, it would seem they would thus be protected from new infections; the mixture could not be expected to reach the fungus already in the bark. It is questionable whether the Twenty Ounce apple should be grown, in the sections involved, on its own body and branches. Top-grafting on Baldwins has resulted well; more top-grafting might profitably be done with certain non-resistant kinds of fruit trees. It would no doubt be profitable to cut out the diseased spots where they occur in valuable trees, disinfect the wounds with one tenth per cent corrosive sublimate solution and paint the wounds with liquid grafting-wax.—*Country Gentleman.* West N. Y. Horticultural Society.

PEACH TREE CURL.

Editor Western Fruit Grower:

The present spring is so favorable to the development of the peach "leaf curl," and specimens of it, with inquiries for remedies, are coming in so frequently perhaps a brief statement concerning it will be of interest to your readers.

The "leaf curl" is caused by the fungus Taphrina deformans. Being a fungus disease it should be treated as such and care taken to prevent its spreading through an orchard it has once entered. It attacks the peach leaves in the early spring causing them to become discolored, misshapen and sometimes thickened and curled. When the new leaves are badly infected they soon fall off. Unless the tree is weakened too much new leaves usually form and the tree may make a fair growth and mature some fruit. The fungus is worst in cold, wet weather.

The best recommended remedy is to spray, before the buds start in early spring, with ten pounds of lime, six pounds of Copper Sulphate and fifty gallons of water. One spraying should be made three weeks before the buds start and the other just before they start. If applied after the buds start this mixture will injure the new growth. Once the "curl" appears in an orchard it is liable to occur in subsequent years, hence trees affected this spring should be sprayed before growth begins next season.
Very truly yours, J. C. WHITTEN, Columbia, Mo.

THE PEACH TREE BORER.

The peach tree borers are very widely disseminated. These insects strongly resemble the wasp family. They fly only during the daytime, and are quite active on the wing. They appear during July and August. The sexes differ very much in appearance. The female is much the larger, having a broad, heavy abdomen. The body has a glossy steel-blue color, and a broad band of orange-yellow across the abdomen. The four wings are opaque and similar to the body in color. When the wings are extended they are one and one half inches across. The male is smaller, its wings not measuring more than an inch. The wings are transparent, the veins, margins and fringe are steel-blue, and a steel-blue band extends nearly across the middle. The female deposits her eggs on the bark of the tree at the collar. They are very small, and are fastened to the tree by a gummy secretion. As soon as hatched the larvae works downwards in the bark to the root, forming a small but winding channel, which soon becomes filled with a gummy matter. As the larvae increases in size it devours the bark and tender sap-wood and causes a copious flow of gum, which soon forms a thick mass around the tree at the base, intermingled with the castings of the larvae. When full grown it is an inch in length and nearly one fourth as much in diameter. The larvae will be found, of different sizes all through the winter months. The larger ones will be found with their heads up in smoother longitudinal grooves which they have excavated. The small ones are found in the gum, or between it and the wood of the tree.

In badly infested trees the bark will be found consumed for from one to four inches at the base or collar, often extending along the roots. This insect not unfrequently will attack the tree in the fork, which may be easily detected by the exudation of gum. When ready to change to the pupa state, the larvae crawls upward to the surface of the ground and constructs a leathery cell or structure made from castings mixed with gum and threads of silk and of a brown color. The pupa state lasts some three or more weeks. It is an American insect, and works also on the plum, but there is no gum attached to its work on the plum. It, however, is seldom found in our wild plums, now that the peach seems more congenial to its requirements.

Remedies.—The most successful, I think, is in mounding the trees in the late spring or early summer, to the height of six inches or more; then level the ground in September—the egg laying having ceased and the moths having disappeared. The major part of the larvae will be displaced by leveling the ground, whilst any, not thus displaced, can easily be removed by scraping the trunk with a knife. This, I think, is the easiest and best method, as a thousand trees a day may be successfully treated. During the past autumn I visited some of the successful peach orchardists of Maryland and Virginia, and found this method the one most successfully used.—*West Fruit Grower.*

WASHES FOR PEACH BORERS.

J. R. L., Birdsboro, Pa.—Last spring, I gave my orchard of 1,200 peach trees, a good coating of a wash advised by a fruit-growers' paper, which was reeommended highly. After being on several months, the outside bark cracked loose from the stems of my trees, and gum began oozing out.

On examination, I found some trees full of little white worms beneath the bark. About 15 trees are already dead, and I may lose several more. A new bark formed on the rest, and the old is scaling off. What can I do to help those trees, and will this be an injury to those yet alive? The wash is as follows: 25 pounds Caustic Potash, three pounds Arsenic, two gallons Crude Carbolic acid, With water, lime and clay to make a stiff wash. Apply with a brush. Would a wash with lime and clay do any good to clean the stems, as now they look unsightly?

Ans.—The practice of smearing the trunks of peach trees to keep out borers, or to destroy them or their eggs, is usually injurious, and in some cases, fatal, provided there is anything in the washes of sufficient strength to disturb the insects. The carbolic acid is the thing that, probably, did the harm in the wash as above stated, although the arsenic might have been somewhat harmful, too. Let such nostrums alone, is my advice. They are troublesome and costly, as a rule, and if strong enough to kill the borers, they will kill the trees, too. Digging out the borers is generally thought to be the safest and surest way to fight them. Nothing will do the trees much good now. H. E. V. D.

PEAR TREES GROW TOO FAST; PEAR PSYLLA.

T. A. P. Independence, Mo.—1. What is wrong with my Duchess dwaf pear trees? They bloom freely, but set no fruit. I have 800, set three or four years. 2. What is the Pear psylla?

Ans.—Without seeing the pear orchard, or, at least, knowing more of the conditions than are stated by T. A. P., it is impossible for me to tell why the trees do not bear. Perhaps they are growing too fast, from too much nitrogen in the soil. But as they have been set only three and four years, it is not surprising that there is not much fruit yet. Do not put on stable manure, but cultivate thoroughly, and if the land is poor, apply dissolved bone for the Phosphoric acid and Potash in the form of Muriate of Potash. Prune back the young growth each year, do your duty as above indicated and be patient. 2. The Pear psylla is an insect which starts from an egg laid in the very small cracks and rough places in the bark of the twigs, in early spring. Great numbers are often laid in a short time. They hatch out in about two weeks, into the little flat creeping things which suck the sap of the tree. They do not move much in this stage, but exude a liquid which is called honey-dew. This is sometimes so abundant as to cover them all over, and even drip and run down the branches and leaves. They become full-grown insects in about a month after hatching, when they have wings and look like very small Seventeen-year locusts. They have beautiful transparent wings, and fly very quickly when alarmed. Kerosene emulsion is the best known remedy, and should be applied in the early stages of life. H. E. V. D.

CORE ROT OF APPLES AND PEARS.

To The Farmers' Review : — For the supply of a home or a distant market it is necessary that the orchardist select varieties of apples and pears that are sound from skin to core. It often happens that a really meritorious variety will show some bad traits. For instance the Clapp pear if eaten at just the right time is a luxury, but if allowed to stand even a few hours longer it becomes inedible from internal decay, and this without any apparent change in the exterior. The same fault has recently been detected in two Russian varieties of pears that were brought to this country only a few years ago. These are the Sapieganka and the Bassemianka, which, on account of their extreme hardiness, have been recommended for places where the winters are severe. They have stood the test of twenty-five degrees below zero without apparent effect. In order to prevent this rotting at the core the fruit, which is of only medium quality, should be gathered at a stage slightly earlier than is common in the gathering of most pears. It may be kept in the fruit room and ripened, the only attention necessary being the removal of specimens as they ripen.

The rotting has been detected in Gideon and Jonathan apples. In the former the decay, which often develops while the fruit is still on the tree, commences in the "water-core," and is at first a moist rot, but as the water is lost by evaporation, it becomes dry, the core part separating from the exterior as it shrinks. This central part may contract to such an extent that it will appear as if suspended between this stem and the blossom end by only a few threads. This state of decay frequently gives no indication of its presence upon the outside until well advanced, the form being retained. The flavor will, however, have been lost. The only way of preventing this trouble with this variety is to gather the fruit as soon as the seeds commence to color and to store them in a cool place, but not in the common cellar. The prevailing condttions of such places will prevent the fruit's keeping for any length of time. The Jonathan has occasionally been troubled with a brown, dry rot of the core, the cause of which is unknown. In one of our orchards we had two trees, one upon a hillside, the other upon the level about fifty feet higher up. The two trees were only about a hundred yards apart. In some years neither tree would be affected, in others both, and sometimes one or the other would be troubled. We did not wish to cut the trees down, because the rotting occurred only once in about three years, because the Jonathan was our best Christmas dessert apple and also because the trees were fairly regular annual bearers.

M. G. KAINS.

AS TO SPRAYING JAPAN PLUMS.

W. A. B., Farmer, N. Y.—Mr. Van Deman recommends spraying Japan plums with Bordeaux Mixture for brown rot, etc. I have read that the Japan plums do not take kindly to the Bordeaux Mixture spray? Is this true?

ANS.—Yes, the Japan and all other plums are quite sensitive to spraying compounds of all kinds, and the greatest care should be used to have an abundance of lime in them to prevent their otherwise harmful effects. The ammoniacal solution of Carbonate of Copper is best for late spraying, after the fruit would show the Bordeaux Mixture still remaining after being gathered. It should be very much diluted with water to make sure that no bad results to the foliage follow its application. Dilute one gallon of the mixture, as the printed formulas have it, in a barrel of water. They say two gallons. A little copper goes a great way in killing fungus germs.

Rural New Yorker. H. E. V. D.

THE IMPORTED CURRANT BORER.

This enemy has been a serious drawback to successful currant-growing in the East for some years. It is an importation from Europe, where it has long proved to be troublesome. In the larva state, it burrows up and down the interior of the stems, making them so weak that when in foliage they frequently break when the wind blows vigorously. The parent of this insect is a pretty wasp-like moth, which measures, when the wings are expanded, about three fourth of an inch across. The body is of a bluish color, the abdomen being crossed by three bands. The wings are transparent and veined and bordered with brownish-black with a coppery lustre. The moth appears about the middle of June, and may be found in the hot sunshine, darting about in rapid flight, sipping the nectar of flowers or basking in the leaves, alternately expanding and closing its fan-like tail, or searching for suitable places to deposit its eggs. The female lays her eggs singly near the buds, where, in a few days, they hatch, the larvae eating their way to the center of the stem, where they burrow up and down the stem, feeding on the pith all through the summer, enlarging the channel as they develop in size. Within this cavity the larvae changes into the chrysalis state. In time they break the filament surrounding them, and emerge prepared to carry on their destruction. They are principally found on the red and white currant, yet not unfrequently on the black currant. Where the stems do not break, their presence may be discovered by the sickly look of the leaves.

Remedies—Cut and burn all branches found to contain the moth. *Western Fruit Grower.*

ORCHARD AND GARDEN.

The men in the employ of the Gypsy moth Commission have begun to spray to destroy the brown-tailed moth. Last winter the Legislature appropriated $10,000, to be expended under the direction of the State Board of Agriculture for the extermination of this pest, which is really a greater nuisance than the gypsy moth, when both are present only in small numbers.

The caterpillar of the brown-tailed moth is covered with hairs almost as sharp as "the quills upon the fretful porcupine," and when one touches the naked flesh it gives a sensation like touching a nettle, and is severely poisonous to some people. It has the peculiarity of hatching out in August and spinning a web around itself while quite small, within which it passes the winter, to emerge and eat the foliage in the spring. The best time to spray them is before they spin their web.

Incidentally the spraying is destroying many of the fall caterpillars or fall web worms which are unusually abundant in many sections, and at the same time the work of gathering and destroying the eggs of the gypsy moth is going on.

If it had not been for the extraordinary expense caused by the war with Spain, we might have hoped for some assistance from the United States in the way of an appropriation from Congress to assist in defraying the expenses of the attempt to exterminate the gypsy moth, but we fear this may not happen now. Congress is apt to be generous before it is just sometimes.

But we have the satisfaction of knowing that Prof. L. O. Howard, entomologist of the United States Department of Agriculture, and many of the leading entomologists of the different states and of Canada have examined some of the territory where the moth larvae were or had been at work, and all have agreed upon the danger of allowing it to spread over the State or out of the State, and also have expressed their approval of the methods adopted by the commission in holding them in check and reducing the extent of infested territory.

It is not the first time that the old Bay State has taxed its citizens and expended its money for that which benefitted other states as well as itself, and it may be that there will be some reward for it in the future.

GOOSEBERRY MILDEW.

The gooseberry mildew may be largely controlled by spraying with Potassium Sulphide, one ounce to ten gallons of water. Begin quite early in spring and spray frequently until fruit is nearly ready to be picked. The English varieties are more susceptible to mildew than the American sorts. In fact, the English varieties are so susceptible to this disease in this country that they are seldom profitable for commercial purposes. Among the best standard varieties of gooseberries are Houghton. Smith's Improved and Downing among the Americans, and, for home use, Industry, an English variety may be grown on account of its large size and fine quality.—*Western Fruit Grower.* J. C. WHITTEN.

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